MAXIMUM POWER COMPUTING
atomic

Antec
Believe it.

CHOOSE YOUR WEAPON

SIGNATURE PSU
650W & 850W

THREE
HUNDRED

NINE
HUNDRED

TWELVE
HUNDRED

War is Coming

DECLARE YOUR ALLEGIANCE

WARHAMMER ONLINE
AGE OF RECKONING

EA

MYTHIC
ENTERTAINMENT

EDHEAD

Tech and the city

Well, here we are again. Where does all the time go?

For one thing, it goes into the immense amount of reviewing we've got for you this issue. I'm a little in love with this month's review section, as it has pretty much everything in it you might need to build a PC. The only think lacking, really, is a power supply, and we have a special plan for all the PSUs we've been hoarding in the labs...

Hint: it rhymes with silly.

But there's a lot more to like about this issue than just the reviews.

While we all like to think that we're Atomic through and through, it's important to remember that a lot of us needed help getting there, so it's worth revisiting the basics every now and then. This issue, I've decided it's time to look at the old challenge of how to pick individual parts for a new PC. A lot of us take that knowledge for granted, or have easy access to some seriously big PC brains. But that's not fair on the up and coming enthusiasts, the serious gamers and builders of tomorrow.
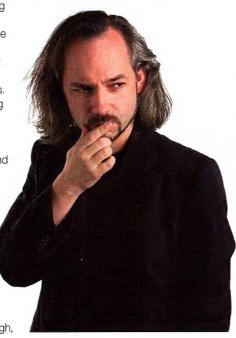
Hopefully, we can get them started right with our guide to building a PC, and choosing the right parts for the right job. It's also just a handy guide to all the latest and greatest tech, too, so maybe you can treat as an easy primer to catch yourself up. And, don't forget, that now if someone asks you about choosing a CPU or what they need for a new PC, you can just hand them this very magazine (and, hopefully) suggest that they subscribe).

Looking beyond the magazine, though, there are other things to get excited about, and chief among them is Atomic LIVE. On October 18, the biggest tech, gaming, entertainment event of the year will kick off at Olympic Park at Homebush, Sydney. It's an enormous day, and if you want to spend it with mates, vendors, the latest games and technology, plus possibly be in the running for some AWESOME prizes, get yourself along to **www.atomicmpc. com.au/atomiclive08** and register for the event.

Do it! I'll be there, looking forward to meeting as many of you as possible.

David Hollingworth
dhollingworth@atomicmpc.com.au

94

atomic

GET DVDs

p.70

November

TUTORIALS 67

GAMEPLAY 83

Pioneer of Innovative Technology

DreamBook Style M66/M54
From $699
RRP Inc-GST

- The BEST VALUE notebook
- Intel Core Duo/Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 15.4/14.1" Widescreen WXGA Display
- Up to 128MB Integrated Graphics
- Optional 802.11b/g Wireless, Bluetooth, Integrated 1.3 Mega Pixel Camera

DreamBook Light IL1 (I'd love 1)
From $449
RRP Inc-GST

New

Up to 8 hours Battery Life

- An amazing new notebook you'll absolutely love
- VIA C7-M 1.0GHz/1.2GHz Processor
- 40GB Hard Drive
- Up to 1GB DDR2 Memory
- 7"/8.9" Widescreen Display
- Optional In-built Camera & 802.11b/g Wireless
- 3-in-1 Card Reader, High Definition Audio

DreamBook Light M72/R
From $899
RRP Inc-GST

12"

- New ULTRA PORTABLE LIGHT-WEIGHT notebook
- Intel Core Duo/Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 12" Widescreen WXGA Display
- Up to 256MB SIS Integrated Graphics
- Optional Finger Print Reader
- 1.3MP Camera Free

DreamBook Style 9008
From $1,099
RRP Inc-GST

New

- New CENTRINO 2 notebook
- Intel Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 15.4" Widescreen WXGA Display
- ATI Radeon HD 3470 256MB PCI Express Graphics
- Free Fingerprint Reader

DreamBook Power 8227
From $1,099
RRP Inc-GST

17"

- New HIGH PERFORMANCE notebook
- Intel Celeron-M/Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 17" Widescreen WXGA Display
- nVidia GeForce Go 8600 512MB dedicated PCI Express Graphics
- Integrated 1.3 Mega Pixel Camera

DreamBook Power M57T
From $2,999
RRP Inc-GST

New

17"

- New CENTRINO 2 notebook
- Intel QUAD CORE Processor
- Up to 4GB DDR3 Memory
- nVidia GeForce 9800GT 512MB
- 17.1" Widescreen WUXGA Anti-glare Display
- Free Fingerprint Reader
- 2 Mega Pixel Camera

DreamBook Power D90
From $2,999
RRP Inc-GST

New

SLI nVidia

17"

FIRST QUAD-CORE!!!

- The WORLD's FIRST QUAD-CORE notebook
- Intel Core 2 Duo Q/X Series Processor
- nVidia GeForce Go 9800GT 512MB x2 SLI
- 17.1" Widescreen WUXGA Anti-glare Display
- 3 x SATA2 Hard Drives with RAID 0/1/5 support
- Optional TV Tuner, 1.3 Mega Pixel Camera, Wireless 802.11b/g/n, Bluetooth

DreamBook Style 825
From $949
RRP Inc-GST

15.4"

- High performance notebook
- Intel Core 2 Duo Processor
- Up to 4GB DDR2 Memory
- 15.4" Widescreen WXGA Display
- nVidia GeForce Go 8600GS 512MB PCI Express Graphics
- Optional Wireless 802.11b/g/n, Bluetooth

DreamMicro SOHO Server 1U S48
From $1,299
RRP Inc-GST

- Slim form factor (1U) server ideal for Network Infrastructure or Web Applications
- On-site service and support packages available
- Intel Dual Core / Quad Core Xeon Processor
- Up to 8GB DDR2 ECC Memory
- Up to 4 SAS/SATAII Hot-Swap HDD RAID 0/1/10/5
- KVM over IP, Remote Management, 3 x Lan

DreamMicro 2U SAS to SAS/SATA JBOD System 1200
From $3,599
RRP Inc-GST

- 2U 12 x hot-swappable drive bays with key-lock
- Dual active-to-active, fail-over SAS JBOD I/O Modules
- Two 3Gb/s SAS Ports on each SAS I/O Module
- 500W Redundant hot-swappable power & cooling modules
- GUI based SES Management Tool to monitor the system
- Online Firmware Upgrade ensures system's high availability
- By daisy-chaining JBODs, supports up to 96 HDD's

DreamVision Power SLI PC
From $949
RRP Inc-GST

- Powerfull Dual/Quad Core Performance
- Intel Pentium D / Core 2 Duo / Core 2 Quad CPU
- Up to 8GB DDR2/DDR3 Memory
- Up to 2 x nVidia GeForce 9800GX2 1GB PCI Express SLI Graphics Cards
- Up to 3 SATA Hard Drives RAID 0/1/5
- Multiple case choices & customisable options

DreamBook Tough S15
From $2,499
RRP Inc-GST

15.4"

- Great Tough Notebook
- Rugged exterior, shock and spill resistant
- Drop proof under 76cm
- Hot Swappable Battery
- Integrated 1.3 Mega Pixel Camera
- Smart Card Security Feature
- Military standard 810F

All prices include GST, exc. freight, all images are for illustrative purposes only. Errors and omissions accepted. Free 1 Year On-site Pickup & Return Warranty, 2 and 3 Years Optional.
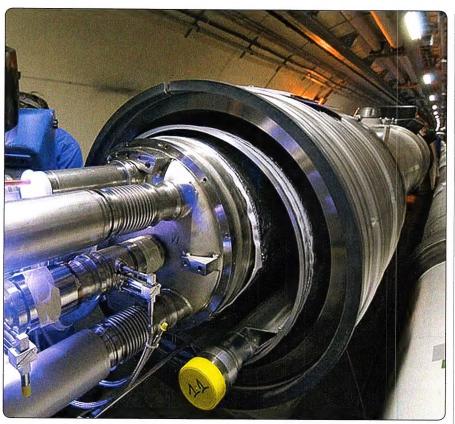• ISO 9001 Quality Endorsed Company QEC11489 • Commonwealth Government Endorsed Supplier 263 • State, Local, Government, Education Contract Supplier

Google games

Search engine turned publisher?

Google has become so much more than the driving force of the world's most popular search engine. Diversifying into browsers, hardware and applications there's speculation that the company's next target could be the world of games publishing. The combination of Google's Lively 3D world launch and the acquisition of in-game advertiser AdScape has industry analysts falling all over themselves to play the guessing game as to Google's next move. The theory is that the monolithic company could leverage its own IPs – Google Earth/Maps for example – inside a game engine for tracking bad guys or providing the basis for a flight simulator while using AdScape technology to provide revenue from in-game advertising.

BREAKING NEWS: There's a solid rumour going round that Google may well be looking to buy Valve and its Steam game distribution service. You heard it here first!
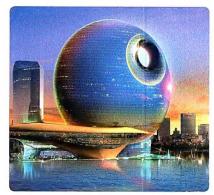
FROM ATOMIC ONLINE

Want the latest news and first looks of new hardware? Then amble on over to www.atomicmpc.com.au. This month, we've been blogging about the World of Warcraft beta for Wrath of the Lich King, and a whole lot more!

Hacking the LHC

And you thought the black holes would get us...

While we were all busy fashioning tinfoil hats, singing Kumbaya and waiting for the apocalypse of Large Hadron Collider (LHC) spawned black holes to destroy us all, we failed to take into account the real threat – geeks! It seems a bunch of clever Greek hackers managed to gain control of part of the CERN computer system that looks after the LHC, and were apparently only steps away from having access to parts of the computer system that have direct control over the vast particle smashing apparatus. 2600, also known as the 'Greek Security Team', found their way into the LHC system and left behind a message saying, "We are 2600, don't mess with us."

"There seems to be no harm done" commented James Gillies, spokesperson for CERN, the orginisation responsible for the LHC. "From what we can tell, it was someone just making the point that the system was hackable."

Scientists believe that a competition between two hacker groups – 2600 and 1337 – initially sparked the security intrusion. Well, at least there aren't any black holes in our coffee cups... yet.

SHORT CIRCUITS

Continuing the trend of geeky architectural marvels from last month's Login, we thought we'd draw your attention to the 521-foot tall hotel being built in Baku, Azerbaijan. The construction company and concept designers refer to it as 'Full Moon' – but don't even try and kid us, this thing is a fully operational Death Star! Well, at least it looks a lot like it from particular angles, which automatically makes it geek-cool. If there was ever a time for a brave Jedi to take up the task of blowing a hotel into bite sized Imperial pieces, it's now.

And you thought your trendy Belkin wireless network setup was cool?

Well Italian scientists think they've got you – and the previous world record for fastest wireless data transmission (160GB per second) – beaten using a technology called 'free space optics'. It revolves around an energy beam being collimated and transmitted through space rather than being guided via an optical cable. The speeds achieved? A scorching 1.2 Terabits per second, which is more than enough bandwidth to download anything and everything 'educational' you've ever wanted. Stop thinking those naughty thoughts.

Give it to me baby

James Matson reckons we're all loot whores.
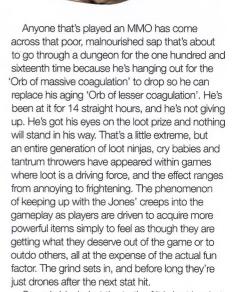
The RPG genre has been responsible for many a gaming innovation in its long journey from pen & paper to PC screen. Of all the treasures the RPG model has given us, the undeniable force that is 'loot' seems to be the most pervasive.

Magical swords, enchanted staves, legendary necklaces and epic gauntlets, you name it; role-playing games have offered it up as a constant source of reward. You can protest all you want that you play WoW or Warhammer for the rich narrative and socialisation, but behind closed doors – when the raid is about to commence – it's all about the delicious loot. Each item we strive for in-game delights us with its seemingly endless

Enhanced weapons, stat increases and persistent medals awarded for various achievements in battle. Sound familiar?

More and more modern FPS games are bolting a class system (another RPG carryover) and loot system into their framework to give a measure of achievement and persistence. In ancient, cobwebby times 16-bit racing games like Lotus Esprit Turbo Challenge would have you pick a car, race with it, and win or lose that would be your car for the entire game. Now you can't put wheels on the track without unlocking better breaks or shinier decals.

So is loot healthy or heinous? Well, there are arguments in both directions. For the

Loot acts as the motivation to keep on keeping on for the reward of something that looks cool and explodes entire planets.

ability to be just a little better than the last one we got, +3 strength becomes +4 strength, then finally +5 strength with a 20 per cent chance to block incoming cold magic.

Remember when you'd load up a team deathmatch FPS and just, you know, shoot stuff? You'd be the same character everyone else was, with access to the same weapons. Fast-forward to Battlefield 2 and you can see the tendrils of the RPG everywhere you look.

ardent gamer the news is good. Adding items, persistent stat increases and so forth to a title increases its longevity and gives the player something to strive for that might be secondary to the main objective. Loot acts as the motivation to keep on keeping on for the reward of something that looks cool and explodes entire planets. Sounds great, but some circles would argue that there's another word inexorably tied in with loot – addiction.

Anyone that's played an MMO has come across that poor, malnourished sap that's about to go through a dungeon for the one hundred and sixteenth time because he's hanging out for the 'Orb of massive coagulation' to drop so he can replace his aging 'Orb of lesser coagulation'. He's been at it for 14 straight hours, and he's not giving up. He's got his eyes on the loot prize and nothing will stand in his way. That's a little extreme, but an entire generation of loot ninjas, cry babies and tantrum throwers have appeared within games where loot is a driving force, and the effect ranges from annoying to frightening. The phenomenon of keeping up with the Jones' creeps into the gameplay as players are driven to acquire more powerful items simply to feel as though they are getting what they deserve out of the game or to outdo others, all at the expense of the actual fun factor. The grind sets in, and before long they're just drones after the next stat hit.

Sounds bleak, but the truth of it is loot is what you make it. It's a great game mechanic that's earned a place among the genres, the trick is to remember that underneath the pile of trinkets there's a game to be played and enjoyed.

GIGABYTE chills out with Atomic

The annual GIGABYTE Overclocking Masters has been and gone. Who won, who chilled, and just how much LN2 can an Atomic event use?

On Friday the 29th of August, Atomic hosted the Australian finals of the GIGABYTE Overclocking Masters series. Competing were Dino and Kayl of Team.au, no strangers to the event, and mighty New Zealander Deanzo. Drinks and good times were had by all.

When everybody had settled in, we got to the the first round: SuperPi8M, which was won by Deanzo. The second round, this time 3Dmark06, was won by Dino.

Yet more drinks and good times continued to

be had by all, and were amplified with the arrival of KISS! Well, people dressed up as Kiss, but it was all very awesome nonetheless. Never let it be said that we don't know how to put on a great night.

This brought us to the tiebreaker: SuperPi4M.

And the winner? Deanzo, who is now being flown to Taipei for the global GIGABYTE Open Overclocking Championship (on as we type).

It was a great night, and we'd like to thank GIGABYTE and everyone who attended to make the night the roaring success that it was.

atomic

THE GREATEST TECH, GAMES AND ALL-ROUND MOST ENTERTAINING EVENT OF THE YEAR

atomic
LIVE 2008

WHERE:
The Badgery Pavillion, Sydney Showgrounds, Olympic Park

WHEN:
October 18th
Doors open 10am, show finishes at 6pm, and there's enough to keep you entertained all day long!

What is LIVE?

The short answer is that it's the greatest day ever.

But you probably want the long answer, don't you? Right? Well, you're in luck!

Atomic LIVE 2008 is an all-day PC, gaming and tech fun-fest, put on for you to catch up on the latest technological innovations from global market leaders, win cool prizes, play computer games, learn a little bit about the industry & leading trends, and maybe even pick up some career advice. It's everything that makes the Atomic magazine and website so great, gathered under one roof.

Highlights

WGT Finals: We'll have the best gamers the country has to offer, vying for victory and some incredible prizes in the Grand Final of the World Gamemaster Tournament. Each game will be called by the guys from the ABC 2 TV show Good Game, with super geek Adam Spencer will be there at the end to award the winners!

Gaming: We'll have several LANs set up for folks to play the latest and greatest competitive games, including for the first time in Australia, you'll be able to play Far Cry 2! Take on the Atomic team!

How to get there

TRAIN to OLYMPIC PARK railway station FERRY Arrives & Departs every hour - From the Wharf: Bus pick up on Ferry arrival, drop off behind train station on Australia Avenue PARKING Free Parking - 2 hour limit (183 spaces) - Showground Road, Grand Parade, Dawn Fraser Avenue, Murray Rose Avenue Metered Parking - $3 /hr /$15 /day P6D (94 spaces) P6E (171 spaces) P6F (506 spaces) P1 (3,323 undercover spaces).

Giveaways: If you register now, you may very well be the lucky person who wins a 22in Viewsonic monitor or a PlayStation 3. Also, hang about on the day and you'll see the good people from Altech giving away prizes every hour on the main stage.

Cosplay: We like dressing up, and so do you! So let's celebrate it with the best, whackiest and coolest costumes from anime, sci fi or whatever your fave make believe is!

The mainstage: Here we'll have presentations on the latest tech trends, competitions and giveaways, educational seminars and the latest movie and anime trailers. We'll be holding the speedbuilding comp again – if you're the fastest to put together a system from scratch you'll win the whole kit, including the super Antec skeleton and all the bits from Altech!

Vendors: ASUS, Altech, AMD, Sapphire, Coolermaster, WD, Viewsonic, Anywhere, Kingston and many more great distributors, hardware makers, dealers and retailers will have stands on the show floor.

A view of the ATLAS detector during installation.

Collision with destiny

The Large Hadron Collider is the most expensive experiment in history of our planet. What does it aim to find, and what could this mean for our future?

Particle accelerators are nothing new: we've been playing with accelerators since 1929, and even your old CRT monitor is a form of particle accelerator. But atom smashers, as they are sometimes called, are designed to accelerate particles to incredible speeds for the sole purpose of colliding them together – just to see what happens.

That's what the Large Hadron Collider (LHC) is all about, except it happens to be the biggest and most powerful particle accelerator ever built.

Inside the LHC

Started in 2001, the Large Hadron Collider is a joint project by CERN, Europe's leading nuclear research organisation. The acronym comes from the French translation, *Organisation Européenne pour la Recherche Nucléaire*. To give you an idea just how important CERN is: the web (as distinct from the *internet*), including the world's first web server, began at CERN.

The LHC itself occupies a 27km tunnel, based 100M underground and crossing both French and Swiss borders, that used to house the LEP (large electron positron collider) built in the 1980s, and in operation from 1989 to 2000. The LHC was built to replace it, and it comes at a cost of some six billion euros – at least so far, as running costs add to the construction costs – making it the most expensive experiment in history.

And with it the promise to reveal answers to some of physics' most mysterious questions.

One of the experiments that will be carried out includes looking for elusive dark matter and dark energy. Physicists can see the effects of dark matter and dark energy through the gravitational forces they exert, but haven't been able to actually detect them. It's an important investigation – all matter, from that bit of crud under your

fingernail to the distant suns millions of light years away, comprises only about four per cent of the universe. The rest, it is theorised, is dark matter and dark energy – but where is it? This is one question the LHC should shed light on.

Then there's the question of anti-matter. Physicists believe that at the time of the Big Bang equal portions of matter and anti-matter existed and, even if large portions of matter and anti-matter cancelled each other out, there was clearly enough matter left in the universe to create the universe we have today – but we can't find the remaining anti-matter that should also exist. The LHC may be able to answer the question of where it went, or where it is now.

But perhaps the most important discovery waiting to happen however is the more publicised one – the Higgs-boson particle. While the other mysteries are (clearly!) well worth exploring,

the Higgs-boson is a problem right in front of our eyes, quite literally: what gives matter its mass? We know that matter has mass, but we don't know why, and whatever it is, it's holding the entire universe together. The Higgs-boson is theorised to be the key, and the LHC can find it.
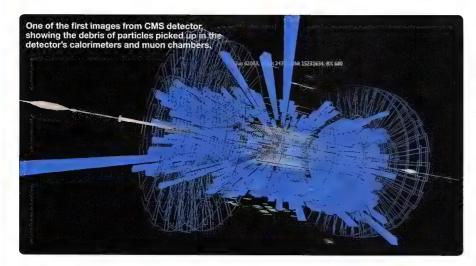
The Higgs whatchiwhat?

First hypothesised in 1964, the Higgs-boson particle is a neat theory for a piece of the puzzle we don't yet have.

The accepted 'Standard Model' of physics (for which we are well short of space to go into here) dictates that universe is made up of twelve fundamental particles governed by four fundamental forces. As a model, it's become a standard because it's successfully explained not only the results of many experiments over the years, but

The LHC viewed from the air.

One of the first images from CMS detector, showing the debris of particles picked up in the detector's calorimeters and muon chambers.

also successfully predicted a wide variety of phenomena that were later discovered.

So it works pretty well for us.

However it's not complete: of the four forces it only successfully describes the strong force, the weak force, and the electromagnetic force through their corresponding force carrier particles that have been discovered (particles that transfer force energy between matter, and belong to a group of particles called 'bosons').

Gravity, though we know it exists, hasn't yet been explained by a corresponding force particle. The Standard Model theorises it should exist, but it hasn't yet been found.

So there's still more work to be done.

Another missing component, which much of the model depends on, is the Higgs-boson. It's just a theory, but one that satisfies an inexplicable loophole. It runs something like this:

The Standard Model states that electricity, magnetism, light and some types of radioactivity are all manifestations of a single underlying force called the 'electroweak force' – one of the four fundamental forces. Mathematically for this to be true the theory for force particles requires they should have no mass, but this has already been disproven. Which means although the Standard Model seems to accurately describe what we see in the universe, it's also missing something.

One of numerous physicists working on it, a physicist called Peter Higgs, proposed a theory by which matter gets its mass and which later became known as the *Higgs mechanism*. The Higgs mechanism defines a gigantic field created in the Big Bang that spreads across all time and space called (not surprisingly) the *Higgs field*, indistinguishable from empty space, and through which all matter interacts. And it's the Higgs field that gives matter its mass, with particles that interact with it as they move through it gaining more mass than those that don't.

A good analogy here is to imagine an object moving through a viscous substance like honey – the honey slows it down, and the bigger the object the more honey it will interact with and the more it will be slowed. The theory goes that some particles, like photons in light, aren't being affected much at all by the field while others, like

the particles that form the building blocks of the atoms in your body, are. And the magic ingredient that endows mass from the Higgs field to the interacting particle is the Higgs-boson.

It may sound like a convinient theory, but it's the best we have – physicists can't currently explain, for example, why one particle has a different mass to another, or even why particles have mass at all. There are many characteristics we know about particles, like charge or spin, but none of these dictate or create mass. Said another way: as far as our understanding of particle physics goes, mass doesn't exist. But you only have to hold your hand in front of your face to see it does – so how does mass get there?

If the Higgs-boson particle exists, the LHC should be able to find it. If it does, it will complete a great void in our understanding of the universe and open up a whole new school of physics. If it doesn't that's good too – it means the Higgs field theory is wrong and we can go back to the

drawing board and see what else we can come up with. Either way is progress, and why the LHC is so fundamental to the understanding of physics today.

Lightspeed collision

To run the experiments on the LHC two separate but adjacent pipes run the 27km course, which combine at only four intersection points. Each pipe contains a proton beam, running in opposite directions to each other around the ring. It's at the intersection points that the beams are guided to collide, and where the various detectors are placed to measure the results.

In order to contain and guide the beams tremendous magnetic forces are used – in all there are 1,232 superconducting dipole magnets, each 15 meters long, to bend the beams around the ring, while another 392 quadruple superconducting magnets, each 5-7 meters long, focus the beams. Many of these magnets weigh over 27 tonnes, and in order to operate at maximum efficiency are cooled using liquid helium to -271 degrees ceclius (*absolute zero*).

Before collisions take place the beams are accelerated to just shy of the speed of light (some 99.999 per cent the speed of light), at which time the proton beams lap the 27km circuit more than 11,000 times per second (!). In order to facilitate timed collisions, the beams aren't continuous but instead are produced in 'bunches', which are estimated to contain some 280 trillion protons each, all running at near the speed of light, squeezed into a width thinner than a human hair. The energy contained within the beams is so potent that stray particles could destroy the superconducting magnets, and stopping the beams is a science unto itself (see below).

When beams are crossed and collide at the in-

Superconducting Coils
Beam Pipe
Heat Exchanger Pipe
Helium-II Vessel
Superconducting Bus-Bar
Iron Yoke
Non-Magnetic Collars
Vacuum Vessel
Radiation Screen
Thermal Shield
Spool Piece Bus Bars
Quadrupole Bus Bars
Auxiliary Bus Bar Tube
Protection Diode
Instrumentation Feed Throughs

The 15-m long LHC cryodipole

A cut away view of one of the 1232 liquid helium cooled 15 meter long dipole magnets embedded in the pipe.

ATLAS	Detector characteristics	
	Width:	44m
	Diameter:	22m
	Weight:	7000t
	CERN AC - ATLAS V1997	

Muon Detectors — Electromagnetic Calorimeters

Solenoid

Forward Calorimeters

End Cap Toroid

Barrel Toroid — Inner Detector — Hadronic Calorimeters — Shielding
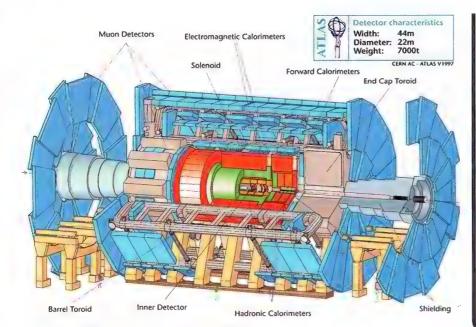
Diagram of the ATLAS detector, weighing in at 7000 tonnes.

Of fear and sobriety

Whenever humanity explores the unknown, irrational fear will divide some of the population. That the LHC is exploring hitherto unknown areas of physics, including the very origins of our universe, it's not surprising that doomsday naysayers and other – for want of a better word – 'nutters' have crawled out of the woodwork.

Scientists at the LHC have received death threats, and numerous anti-LHC sites can be found on the net (such as **www.lhcdefense. org**). In the interests of free speech those motivated by fear have as much right to voice their concerns as anyone else – it's just worth noting they frequently come without any basis in fact. Not surprisingly there are also numerous sites (like **www. cyriak.co.uk/lhc**) featuring spoofs of grand disasters caused by the LHC, showing that while some choose to cower in fear at the unknown, others prefer to poke fun at it.

tersection points, a number of detectors measure the results. The four key detectors include ATLAS (A Toroidal LHC ApparatuS) and CMS (Compact Muon Solenoid), which are designed to look for evidence of the Higgs-boson, dark matter, and even extra dimensions; ALICE (A Large Ion Collider Experiment) which will look for evidence of quark-gluon plasma, which is supposed to exist in the first moments of the Big Bang and could help reveal how matter was made; and the LHCb (Large Hadron Collider beauty – yes the acronyms don't mean much!) which will analyse the interac-

monitored and as soon as temperature fluctuations occur a 'quench' is ordered which, in effect, causes the beams to be stopped and power to the affected magnets immediately cut. Then, to protect them, powerful heaters kick in and heat the 15 meter long magnets to 300 degrees Celsius in the space of two minutes.

Beams have a maximum cycle life of about ten hours in the ring, and stopping them at the next cycle or if a quench occurs is another matter entirely – the energy contained in a single beam could melt through 40 meters of copper in less

times. At this stage they'll still bore a hole in most any substance, and so another set of magnets directs the diluted beam in a scanned pattern (similar to the way a CRT monitor is scanned) to dissipate heat over the surface area of what's known as a *dump block* – a rather large eight meter long and one meter in diameter block of graphite composite, all secured within 1000 tonnes of concrete on all sides. Dumping takes just 80 millionths of a second, and heats the graphite to around 750 degrees Celsius in the process but does not melt it.

What have we found?

At time of writing the LHC had just gone online with preliminary tests and, unfortunately, an electrical fault between two magnets caused a shutdown that's going to take a few months to repair.

But even then, answers may not come quickly. If the Standard Model is correct, it's estimated a Higgs-boson may be produced every few hours, but even at this rate may take up to three years to collect enough statistics to confirm one way or the other its existence.

To learn more about the LHC, the various detectors (each of which has its own website), and the physics being explored a good place to start is at **public.web.cern.ch**.   **AM**

... to protect them, powerful heaters kick in and heat the 15 meter long magnets to 300 degrees...

tion between matter and anti-matter in an attempt to determine what happened to the universe's missing anti-matter.
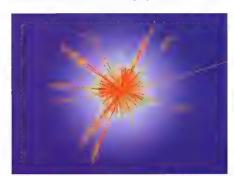
Then there's TOTEM (TOTal Elastic and diffractive cross section Measurement) and LHCf (Large Hadron Collider forward) – the results from which are designed to complement the other detectors, and shed light on the nature of cosmic rays (which, even before the first beams were sent around the LHC, could be seen being picked up by the detectors – rays passing through planet Earth, as it were). Of all the detectors the CMS is the biggest, weighing 12,500 tonnes.

Saving the LHC...

The tremendous energy contained in the beams is so strong that stray particles could melt the superconducting magnets and damage or destroy the LHC. If enough stray particles hit the same magnet in succession, its operating temperature could raise from -271 degrees Celsius to 700 degrees in less than a second, causing a chain reaction as beams become unconstrained. As a result the ring is constantly

than a second. If this dissipation of energy occurred anywhere inside the ring, it would destroy whatever it penetrated.

So, in a process known as 'dumping', beams are directed through exit segments in the ring by 'kicker magnets' that propel them into special dump blocks designed to absorb the energy. After first kicking them, the beams are then 'diluted' by a series of ten special magnets that scatter the beam and reduce its intensity by some 100,000

A simulation of the type of results detectors might pick up from a collision.

INPUTOUTPUT

Dan Rutter brings the answers Ito your
questionsl like no-one else can.

I/O OF THE MONTH

There's a lot to be said for the PC speaker

I I read with interest the review in Atomic issue 92 of the Creative SoundBlaster X-Fi Titanium (the marketers have been at that!). It was all sounding good, up until this bit:

"Installation of the card caused several BSODs, with the Creative installer, dll and hardware detection engine still being quite messy. We also experienced a fairly serious OS level corruption problem when trying to run the X-Fi Titanium in the same host system as an Auzentech X-Fi."

After reading this, I have two questions.

1: Is the positional audio in 'EAX Advanced HD 5.0' any better than (or even as good as) the 3D positional audio I was getting in my Diamond Monster Sound MX300 back in 1998, before Creative crushed Aureal with its marketing machine, bought all Aureal's tech, and sat on it for ten years?

2: Is there a way to get something like the X-Fi's capabilities without BSODs and OS corruption all over the place? I'm running XP, as I'm yet to see any compelling reason to 'upgrade' to Vista.

Bernard Walsh

O Technically, no version of EAX does 'positional audio'. As the name 'Environmental audio extensions' suggests, EAX adds environmental effects, things like reverb, spectral changes for nearby sounds, and objects occluding sound from things behind them, to positional audio. It's an extension to DirectSound3D, which is the actual positional audio engine.

This isn't just nitpicking; it helps to explain the mess that '3D sound' is currently in, especially for Vista users.

DirectSound3D-plus-EAX certainly didn't start out sounding any better than Aureal's A3D, but yes, the current version is clearly better. It's perfectly possible for a given game to still sound lousy – getting 3D sound right is one of those things, like efficient game saving, that is often a low priority for game developers who're working to a deadline. But the current incarnation of DS3D/EAX has tons of features that A3D lacked. It can create far more realistic audio effects than

the simple positional-audio-plus-some-reverb that let you know someone was sneaking up on you from behind and to the left when you played Counter-Strike in Win98 with a Vortex 2 card in 1999.

But, at the same time, Creative's drivers are famously bad. They sell so very many cards that any flaw in the software is magnified by the sheer size of the user base, but that doesn't account for all of the awfulness. Because Creative rules the PC sound-card market, it doesn't seem to have a lot of motivation to get its software right. If there was a sound-card ATI out there to Creative's NVIDIA then we'd probably have sound drivers that weren't any buggier than current video-card drivers. But there isn't, so we don't.

What you want is an Asus Xonar sound card. They come in PCI and PCIe x1 versions (and in USB versions as well, but that's not what we're talking about here).

I'm being so specific because Asus currently has an exclusive deal to make sound cards that use C-Media's top-end Oxygen HD chips. Before this there were a few Oxygen HD cards with wonderful names (Bluegears b-Enspirer! Zoltrix Nightingale!), but they're not being made any more. The companies that made them have either given up on high-end sound, or switched to Creative chips.

Meanwhile, Asus are printing 'ASUS AV100' and 'ASUS AV200' on the chip packages, but there's a CMI8788 inside. It gives the Xonar cards some better baseline specs than any X-Fi card – better maximum sample rate and depth, for instance, plus multichannel-encoded Dolby Digital and DTS output via digital connectors.

That stuff isn't likely to matter much to gamers, but EAX 5 support does, and the Xonars actually do have that – after a fashion. EAX belongs to Creative, and anybody who wants to use it has to license it. The Xonar cards, instead, have 'DirectSound 3D GX 2.0', which is basically ASUS's own software-emulated version of DS3D-plus-EAX-5. Which works
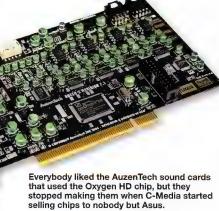
much the same – with every game that supports EAX – and annoys Creative no end.

Now, because this is an EAX-alike in software, it'll give you slightly lower frame rates. But so will a Creative card if you ever upgrade to Vista, because Vista quite simply does not support hardware-accelerated DirectSound.

Vista does let you hardware-accelerate OpenAL sound, but tons of games don't support OpenAL. This is why Creative came up with its 'Alchemy' hack, to translate DS3D calls into OpenAL calls on the fly.

My own favourite PC audio adapters at the moment are the little two-connector USB-dongle '5.1 3D Audio' doodads that're all over eBay for around five bucks delivered. Ignore the '3D audio' stuff; they're actually just a stereo output and a mic input, both of which should work with the built-in USB audio drivers on current PCs and Macs.

A simple stereo adapter like this isn't what you're looking for, though. You can still get some degree of software positional audio out of them, without paying much of a frame-rate price (because modern CPUs are so fast), but they're not in the same class as proper 3D sound cards.

Everybody liked the AuzenTech sound cards that used the Oxygen HD chip, but they stopped making them when C-Media started selling chips to nobody but Asus.

A paper clip's good for about 20 amps

I My son's computer died and through a process of elimination I worked out that it was the PSU. I was about to run out and buy a new one when a guy at work told me that PSUs often have an internal fuse. I thought "what the heck, I can't make it any worse than it is", so I opened it up and sure enough there was a fuse and it was cactus.

I then promptly misplaced the dud fuse but went to Jaycar anyway and got a range of fuses from 1amp through to 10amp, thinking I should start with the lowest rating and work my way up if they pop.

I have done a search for my Atlas LC-B350ATX PSU to no avail. The circuit board has stuff printed on it where the fuse is, but nothing that is really clear to an ignoramus like me. It seems the circuit board might be common to many wattages of PSU, as there is a list of stuff printed. So...

(a) Can I damage the system doing it the way I plan to?
(b) Does the dud fuse point to a problem elsewhere in the PSU anyway?
(c) Why do they put fuses inside? Are you meant to run out and buy a new PSU even though it may be something simple?
(d) Could a power surge have damaged the fuse?

Russell Stapleton

O Do not do this.
Fuses have a particular value for a reason, and yes, the fuse problem may point to a serious failure.

If you replace a fuse with another one that has a significantly higher value, you will lose some of the protection the fuse is meant to provide. If you replace the fuse with one of a lower value, you will of course just get nuisance fuse-blowing in non-dangerous circumstances. Yes, it might just have been a power surge that popped the fuse, and the PSU may otherwise be perfectly fine. But if there's actually something wrong that's causing the PSU to blow fuses, you won't be able to tell the difference between a nuisance-failure and one that's happening for a good reason, and you'll just keep swapping in bigger and bigger fuses and bringing the PSU closer and closer to a more dramatic failure.

Fuses have their value stamped on one end cap (though it's sometimes rather hard to read, especially, as you say, if you've lost the fuse). Only replace fuses with ones of the same value. And also of the same type, either fast-blow or slow-blow. Fast-blow fuses (which is almost certainly what you're dealing with here) have one thin wire through them, slow-blows have a little coil of wire at one end.

In the real world, replacing a (say) 1A fuse in a non-defective device with a 2A one is not a horrible crime. It may mean the PSU will now explode a voltage regulator to protect the fuse from damage, but a relatively minor fuse rating boost like this is not a major fire risk like the classic example, the replacing of house fuses with nails or copper coins. But still: don't do it.

Also, bear in mind that the big capacitors inside the PSU may still be holding a charge, which can give you a very exciting surprise and possibly do you serious harm. Any proper PSU design should have drain resistors that empty the caps in a matter of minutes, at most, but I'm sure there are many dirt cheap PSUs that save four cents per unit by leaving them out. Avoid unnecessary fingerpoken und mittengrabben. If paranoid, keep one hand behind your back, so it's impossible for a charge to cross your chest.
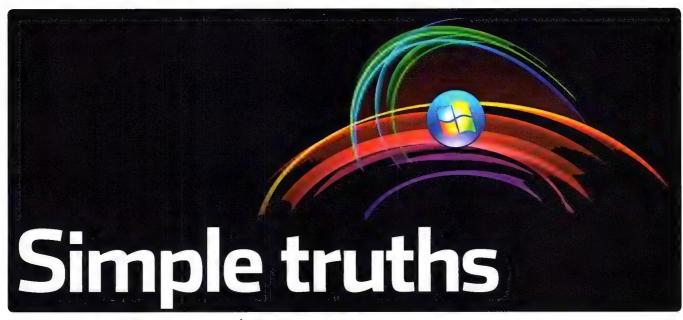
(Feel free, though, to try tricking the PSU into powering up outside the PC by connecting pin 14 on the ATX plug to any ground with a paper clip, as I explain in **http://www.dansdata.com/danletters074.htm**. This is quite safe, as long as the lid is on the PSU; if you plug the clip into the wrong holes and connect +5V or +12V to ground then you can confidently expect that fuse to pop again, but that's about the extent of the possible danger.)

And yes, it's normal for cheap PSUs to share one circuit board across numerous models. The companies that 'make' them just tick boxes on a menu of features they want 'their' PSU to have, and then a factory in Guangzhao sticks the appropriate components on a one-size-fits-many circuit board. Really cheap PSUs are sometimes all actually exactly the same on the inside – the only thing that's different between the 400W model and the 700W one is the sticker!

In answer to your third question – I'm not sure why they put replaceable fuses inside the PSU casing. I suppose it could just be another penny-pinching measure (some super-cheap PSUs have the fuse soldered to the circuit board, not even in a clip-in holder, to save a couple more cents...), but even luxury PSUs don't seem to have the rear-mounted fuse holders or circuit breakers you'd expect if this were the case. Though some of them may have self-resetting internal circuit breakers – I don't know about that, either.

It'd make sense to have the fuse on the inside if it were purely there as a fire-prevention everything's-gone-haywire PSU-is-unsalvageable emergency measure, but this is clearly often not the case. Many people have replaced these fuses and thus revived a PSU.

I don't just make these numbers up, you know. This is a paperclip passing 20 amps, a moment before it melts. About fifty watts, in case you're wondering.

Simple truths

**Well, that's one way to spend $US300 million.
You know the ads – Jerry Seinfeld, Bill Gates, what could possibly go wrong?**

Oh, not too much – except perhaps the message. Aside from the anti-humour and the absence of a point, the ads go so far as to alienate the common populace: Jerry and Bill living with 'normal' people complaining about how obscenely rich they are? Like its OS, the ad campaigns show just how disconnected

seen to be aligned with Apple's brand because it's (even if obnoxiously so) hip and cool. And for some reason, lots of people want to be hip and cool.

And Linux, well, speaking as one of the congregation, Linux users can be just as fanatical as Mac users, only they have a sort

The ads did get people talking, just not the conversation Microsoft wanted them to have. Let's hope that while Microsoft is trying to spread a new message with its ads, that it also learns to take one from their response.

Could be me, but I can think of far better things to do with $US300 million – it's a crazy idea I know, but how about this: make a *good* operating system, from the ground up. **AM**

But Windows... if anything, it illicits an all - encompassing emotion: meh. And ultimately, people don't choose meh.

*Everybody hates Windows,
but whatcha gonna do?*
amills@atomicmpc.com.au

Microsoft is from its users. In many ways they are typical of Microsoft products – bloated, missing the mark, and failing to live up to expectations.

It's no surprise then that the response to the campaign is an almost universal WTF?

The point of the advertising, of course, like any advertising, is to generate or perpetuate a conversation, a message. After all, it's not like Windows is sexy, cool, or the shiz. The brand, for the most part, is basically vapid, vacant, and devoid of volume. Which is precisely what Microsoft was hoping to change – to generate a connection where there is none.

Mac users are *rabidly devoted* – they have a passionate and strong emotional connection that could only be stronger if they built shrines to Steve Jobs in their homes, some sort of suspended Macbook Air surrounded by iPod angels hovering above an image of the Great Black T-Shirted One. Given that one follower had a FireWire logo tattooed to her arm at the opening of the Sydney Apple store, I wouldn't put it past some of them. There's value in being

of quirky realism about them. They tend to focus on the merits of the OS than what it means to be someone who uses it, but their hearts are in the right place at least. And there's value in being aligned with the Linux brand as well because it's the fighting underdog, and the better operating system to boot. And, of course, Tux as a logo generates a connection all on its own.

But Windows... well, if anything it illicits an all-encompassing emotion: meh. And ultimately, people don't choose meh. For most of us, meh was just there when we got our PCs. For Microsoft, there's no intrinsic value to which a positive spin can be applied. And this means, most importantly, there's no connection, no emotional attachment. If there's no attachment, there's no loyalty, and as Mac and Linux continue to evolve Windows will slowly die.

The irony about the ad campaign is that in an effort to change the message about Windows the company invariably confirms the one that's already there: Vista sucks.

If it didn't, the campaign wouldn't be necessary.

Designing the
Perfect

PREMIUM
GRAPHICS
ATI
RADEON™

PC
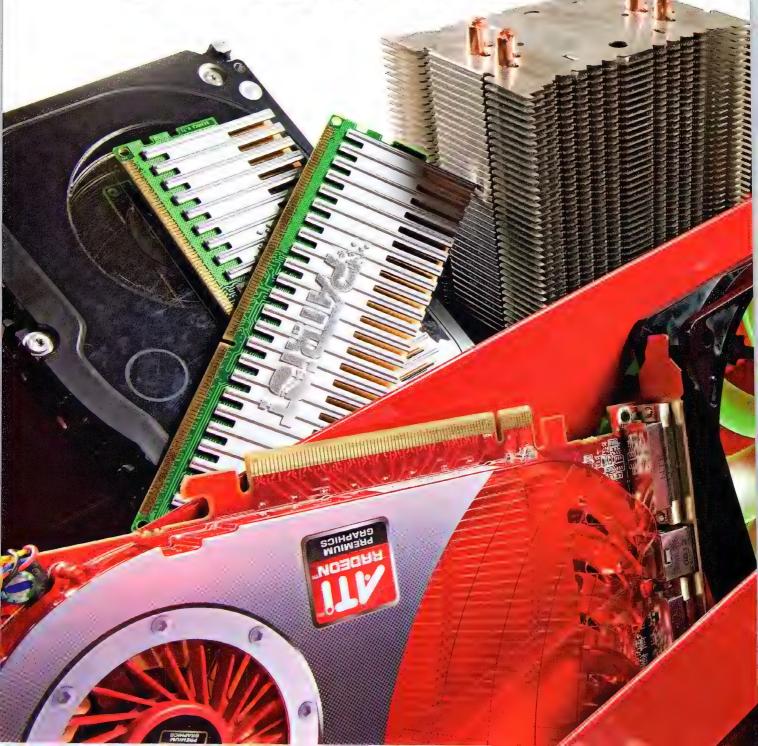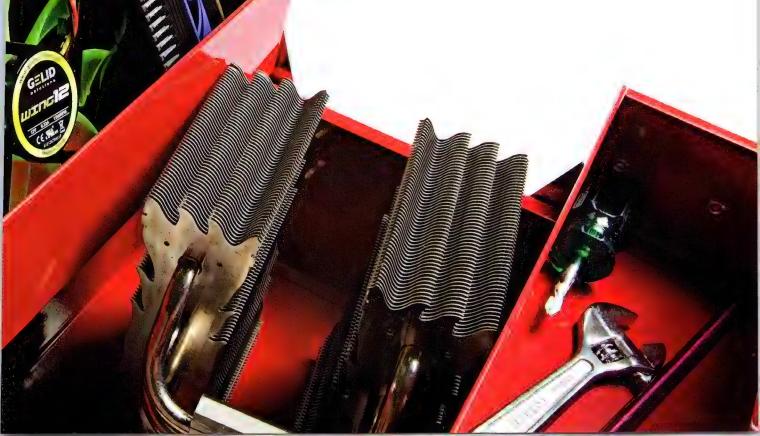
PC Design 01100101 with **Vito Cassisi**. And yes, that is binary for 101.

B uilding a new PC cannot be any easier. It's a matter of slotting components into their respective sockets, and plugs into their female counterparts. But where most people fail is in the designing process, where you need to choose the perfect parts for the ultimate price

vs quality vs performance ratio. But this will no longer be an issue once you've learnt the way of the computer enthusiast; how we research, review and rate a product, and only allow the finer quality components grace our glorious desktops. It's time to be enlightened into the world of PC design...

Deciding the computer's main role

It's human nature to seek the best components our budgets can satisfy, but often the appropriateness of these decisions is not a reflection of the desired end result. Hence we need to define what this 'end result' will be. There are four main categories:

- Media Centre PC/HTPC
- Home/Office/Multimedia
- Gaming /Graphics Rendering (which incorporates enthusiasts and overclockers - us)
- Server

Computers come in many form factors including the popular mini-ATX, ATX, and E-ATX. These define the physical size of the computer where mini-ATX is best suited to portable/HTPCs, ATX for standard office work or gaming, and E-ATX for high performance enthusiast systems and servers. Choosing the appropriate size depends on the main role of your PC. Size dictates the components that will fit, so it's best not to choose the smaller form factor if you don't need the smaller size. If you're not sure about what size to choose, bigger is better. More room to work, upgrade, and hack. Oh yes, bring on the water cooling system.

Allocating the budget

The budget is the maximum you're comfortable spending on the PC. Once you have calculated this, stick to it. If you're wealthy and have quite a bit of money to burn, this doesn't mean you should buy the best of everything. There's often a large price gap between budget, performance, and extreme; however the difference in actual

performance is rarely as straight forward. The gap between budget and performance components is often quite large compared to the gap between performance and extreme. Extreme components may only be, for example, 10 per cent more efficient than the performance parts, yet the price 50 per cent higher in cost. Try to find the best 'bang for buck' unless you genuinely require the extra performance.

The required parts

A computer system consists of the following components; use this as a checklist:

- CPU
- RAM
- Motherboard
- Graphics card
- HDD or SSD
- Power Supply
- APU (usually integrated into the motherboard)
- Optical Drive
- Case

Basic external peripherals include:

- Monitor
- Keyboard
- Mouse
- Speakers

All these components (plus an operating system) make up a standard system. Be sure to consider all these parts in your design.

Recycle and save

No, this is not about scavenging aluminium cans for the 5c rebate, but rather parts from

your older machine. Peripherals such as the monitor, keyboard, and mouse can be reused if they still suit your current needs and desires. Generally, processing parts such as the graphics card (or GPU), CPU and RAM will be outdated, and should only be used if suitable. A previously used OS can also be installed provided they aren't OEM or insufficient for modern use i.e. Windows ME (read: Burn it. Now). Vista 64-bit is recommended for new systems due to its modern CPU scheduler, enhanced security and ability to address stupid amounts of RAM.

Selecting components

This is often the toughest step for system builders. Choosing suitable components requires a fair bit of researching including reading reviews, benchmarks, and forum threads. Never buy parts because they 'sound cool', have an appealing advertisement, or because your friend has one. Chances are that the product is not the best value in respect to your individual situation. The following sections will describe methods of choosing each system component.

The Motherboard

A motherboard is a series of busses and chipsets that control the communication of each connected system component. Typically it is the last part to be chosen as it needs to be compatible with all other selected components. That being said, it should be considered throughout the course of the build.

There's no hard and fast rule when selecting a motherboard, but a general process should be followed to maximise the success of the build:

You won't get very far without a motherboard - the foundation of any good system.

atomic

Selecting the desired chipset: The chipset defines the choice of CPU(s), the GPU bandwidth and scalability, amount and type of RAM, and the overclockability of the system. Generally an NVIDIA chipset allows SLI (Scalable Link Interface), the linking of two or more identical NVIDIA GPUs for combined graphics processing. On the other hand, the Intel chipsets allow Crossfire, which enables two or more ATI GPUs to run in unison. Select the chipset which sports the features you desire (this will require some research), and look out for any new chipset releases. The latest 4-series GPUs from ATI work best in Crossfire when used with an X48 chipset. Although Crossfire is compatible on all current Intel chipsets, the performance takes a hit without the added bandwidth that the X38/X48 chipsets offer. Current NVIDIA cards aren't as fussy in terms of SLI bandwidth, likely due to their use of lower bandwidth GDDR3 memory, and therefore work well in a range of NVIDIA chipsets. The current NVIDIA picks include the EVGA 750i and 780i FTW boards, which support 2-way and 3-way SLI respectively, while allowing impressive overclocking on the FSB.

Select the form factor: Depending on the purpose of your system, you may need to get a particular sized motherboard. Most enthusiasts will be looking at the ATX and EATX form factors for their range of features and compatibility with high-end gear.

Select the socket type: Unlike in the past, AMD and Intel CPUs use different sockets. Once you've decided on the CPU, the choice between AMD's AM2+ and Intel's LGA775 sockets becomes clear.

Select expansion slots and ports: The number of expansion slots defines the amount of cards that can be fitted at once. If you intend to install multiple GPUs, then full size PCI-e 16x slots are required. There are also PCI-e 1x slots which can be used for TV tuners and other less demanding components. Other important ports/sockets to consider include SATA, IDE, USB, ethernet and audio.

Select integrated components: Do you require inbuilt audio or graphics capabilities? If this is the case you will need to select a motherboard with the appropriate integrated chipsets. Most motherboards include inbuilt audio (usually of Realtek branding) however integrated graphics chipsets are commonly found in lower-end mini-ATX solutions or specialised full ATX solutions. Being enthusiasts, any inbuilt graphics chipsets will be overshadowed by monolithic floating-point marvels of the dedicated GPU variety. 'sif integrated.

Enthusiast specialities: Design advantages such as solid state capacitors and high FSB capability help when overclocking a system.

The brain of the computer – the CPU. Definitely not to scale.

The best way to determine motherboard performance is to seek benchmarks and user-submitted overclock results.

Once you find a few products which match your criteria, seek out comparisons, reviews, and benchmarks for each. This will eventually provide you with a clear winner, and if not, go for the cheaper option with the best warranty. Unless, of course, you have money to burn (in that case, send some our way).

Central Processing Unit (CPU)

The CPU is often considered the most important component within a PC. Whether this is true or not is up for debate, but rest assured, the PC will not function without one. Technologies such as NVIDIA's CUDA platform may one day

prediction and the specialised instruction sets they require; therefore a CPU is still well and truly important. Choosing a CPU isn't particularly complicated if you follow a few simple guidelines. Firstly the main components of the Central Processing Unit must be established.

Cache: Cache is high-speed memory in which the CPU stores data to be processed. The larger the capacity of any given level of cache, the greater the performance. Data which does not fit within the integrated CPU cache is sent off-die to be stored in RAM. On die cache is split into layers, often two or three, each decreasing in speed and increasing in capacity respectively. Therefore, L1 cache is the fastest yet smallest

Choosing a CPU isn't particularly complicated if you follow a few simple guidelines.

make CPUs less important due to the inherent architectural advantages of modern GPUs, but that day is while off just yet. A growing area of interest resides with GPGPUs, General-Purpose Graphics Processing Units, however. These allow otherwise dedicated GPUs to be used for general purpose tasks which the CPU is normally assigned to; in doing so the parallel processing nature of GPUs struts its architectural speed advantage.

Despite this technological advantage, GPGPUs are still a distant future in terms of practicality mainly because of the lack of data

capacity, L2 is larger and slower, and L3 (if the CPU contains such a level) is slower still with the largest capacity.

Cores: The amount of cores defines how many threads that can be efficiently processed at one time. This improves performance, although many applications are still limited to utilising one or two cores at a time. The operating system used also influences the performance of multiple core systems; Vista is better than XP in this regard.

Clock speed: Clock speed is often misused

It's not an Atomic rig if it's not powered by the latest in beastly tech. Extra points are awarded for multiple cards!

when comparing CPUs. The clock speed is the amount of clock cycles per second measured in Hz (or GHz). Clock speed is not an appropriate method of judging processing performance because it doesn't define the amount of data being processed within each clock cycle.

Multiplier: The multiplier is a numerical value which defines the clock speed of the CPU. Higher multipliers are sought after by overclockers, but are usually accompanied by a hefty price tag. Finding the right balance between price and multiplier is a major factor when choosing budget overclocking gear.

Choosing a CPU
CPU selection encompasses the following performance groups:

Performance/Enthusiast/Overclocker: This clique strives to find the highest multiplier they can within their budget. This is also dependant on other key features such as cache and cores, although higher values may decrease overclocking potential. Also, smaller manufacturing processes are desired due to the reduced heat and reduced power consumption.

A great example of budget CPU overclocking performance includes the E8500/E8600 and Q6600/Q6700 Intel CPUs. With 9.5x/10x and

9x/10x multipliers respectively, their overclocking potential is nothing short of mind blowing.
Server: Servers often use specific CPUs designed for accurate computation and high stability, such as Intel's Xeon and AMD's Opteron range. These CPUs typically contain larger cache capacity and are of a higher grade binning.

Binning is the process of sorting components into performance 'bins'. CPUs are tested until they are no longer stable, and when this limit is reached, they are placed into a particular 'bin' depending on the performance demonstrated. It's not uncommon for server CPUs to use different sockets than desktop CPUs, so keep this in mind when choosing a motherboard/CPU combo.

What to research
Using a search engine such as Google is helpful when locating information in relation to the details above. Find model names of CPUs within your price range, and compare benchmarks on tech sites. The best way to find suitable parts is to browse reputable computer forums (such as Atomic) for advice.

Never select a CPU (or any component for that matter) based solely on brand name; always seek benchmarks which show how particular models perform from each brand.

The GPU (Graphics Processing Unit, or graphics card)
GPUs are the driving force for graphically intense applications such as games, 3D modelling/ CGI and video editing. Recently they have

been increasingly popular for calculating large amounts of data in place of existing CPU-based processing clusters, mainly due to their superior parallel processing nature.

The main components of a GPU include:

VRAM: VRAM is onboard memory used to store textures and data waiting to be processed by the GPU core, similar to how the CPU accesses RAM on the motherboard. VRAM is based on the GDDR architecture. Later architectures have larger bandwidth allowing higher transfer rates between the core and memory.

Core: The GPU core is the main onboard processing unit. Similar to that of a CPU, but primarily used to calculate floating-point calculations for graphics tasks.

Pixel Shaders: Pixel shaders convert 3D co-ordinates and instructions into 2D data, or 'pixels', for display on the monitor. The more shaders the better as they act as parallel processors. As with most components, in most cases the performance gain is dependent on the unit as a whole, such as overall architecture, rather than specific elements such as this.

Clock Speeds: The VRAM, core, and shaders each have separate clock speeds. Older GPUs often link the shader and core clocks so that they are in the same ratio; increasing the core will increase the shader. The higher the clock speed the better when comparing the same model amongst different brands. Comparing different models by clock speed is not a true indication of performance; do not do this.

Scalability: Modern GPUs allow two or more cards to be linked to work as one. Some models may have enough connectors to support three or four cards at once instead of the typical two card collaboration. SLI and Crossfire are the main technologies for NVIDIA and ATI cards respectively; most motherboards only support one or the other. Some high end GPUs come in dual core and dual PCB (Printed Circuit Board)

models, which incorporate inbuilt scalability between two onboard GPUs.

Choosing a GPU

As with most components, the choice of GPU depends on the budget and intended usage. It's wise to look out for the following factors in each computer category:

Performance/Enthusiast/Overclocker: High performance GPUs generally have high clock speeds, large memory capacity, and often incorporate dual core/PCB solutions. These cards are best for high end systems which need the extra power. In particular, overclockers prefer smaller manufacturing processes when choosing a GPU to allow higher overclocks with minimal heat.
Server: Generally servers are CPU intensive and don't require much GPU power. Integrated solutions are fine for file, print, and web servers.

The models to look out for include ATI's 4870 and 4870X2, and NVIDIA's GTX280 for high performance systems.

What to research

There are three main GPU manufacturers; NVIDIA, ATI and Intel. NVIDIA and ATI make expansion cards while Intel focuses mainly on integrated solutions. The manufacturer websites provide a list of models they offer, so it's just a matter of searching online for comparisons of models in your price range. Larger monitor resolutions require more VRAM, so be sure to compare benchmarks using the same resolution as your monitor.

The RAM
(Random Access Memory)

RAM is used as the largest cache of the CPU due to its high capacity and low manufacturing cost. A large amount of RAM is essential for new PCs, which are heavily driven by multitasking and an array of services. A common guideline is to buy as much RAM as the budget (and your OS) allows. RAM is made up of the following generalised components:

RAM is so cheap right now, you'd be kicking yourself for not getting at least 4GB.

atomic

The trusty hard drive, filled with all your tasty data. You spin me right round baby, right round...

The faster this rotation, the smaller the seek time is in HDDs. Regular drives are 7200RPM, high-end drives are 10000RPM upwards.

Sustained Write/Read: The speed at which the drives can transfer data to and from the HDD or SSD. The write speed is commonly a measurement of the speed of cached data being written to the main storage platters (or flash in the case of SSDs). Faster is better, speed is typically measured in MB/s .

Capacity: Capacity is fairly obvious – the more capacity there is the more room for data such as software and documents.

Cache: The cache stores data ready to be written to the HDD. Greater capacity generally improves write speeds.

Choosing a HDD/SSD

There are many factors which determine the appropriateness of a HDD or SSD for your intended setup.

Performance/Enthusiast/Overclocker: The main focus for performance systems are high density platter 7200RPM HDDs, Velociraptor high speed drives, and high end SSDs. The first option is cheapest and often the appropriate choice.

Server: High-end servers use SCSI drives which are faster variants similar to that of Western Digital's Velociraptor range. These drives are expensive and require a SCSI capable system.

What to Research?

When looking at storage devices, its best to look for high density platters with large capacities. SSDs should only be factored in if your budget can cater for the exorbitant costs. High transfer speeds can be determined via benchmark comparisons between models.

The PSU (Power Supply Unit)

The PSU is often the most exaggerated component within a PC. It's either chosen with too-limited power (unintentionally, of course), or an excessive amount. The main misconception is the wattage rating. PSUs should not be compared with this alone because of two other underlying factors: the +12v rails and the overall efficiency. More information on these elements can be found in issue 89 of Atomic or the website (**http://tinyurl.com/6z568b**).

Choosing a PSU

There are a few steps to follow when choosing a PSU:

What is the power draw from your system? Find out the power draw of each component at maximum load, then find a total. Seek more than this amount; an extra 50 per cent wouldn't go astray. This ensures that future upgrades can

Capacity: The capacity of RAM is measured in GB (or Gigabytes) on modern sticks. The more the better, but anything over 3GB requires a 64-bit OS and CPU to be accessed. All modern CPUs are 64-bit, so this shouldn't be an issue.

Clock speed: The clock speed defines the speed at which the data can be transferred to and from the RAM. Higher clock speeds are preferred when comparing RAM modules.

Architecture: RAM architecture includes DDR1, DDR2 and DDR3. Each generation of RAM strives to improve bandwidth and overall throughput of data transfer. A side effect of this advancement is higher latencies; however modern systems benefit more so from higher clock speeds rather than lower latencies.

Solid state storage is the way of the future! Just like floating cars, and jetpacks.

Latency: Latency is the gap between a request for data by the CPU, and the transmission of said data. Although lower latency is preferred, it isn't important compared to larger clock speeds.

Choosing RAM

DDR2 is the cheapest solution at this point in time, while DDR3 has theoretically higher performance. If going with DDR3, look at modules which are over 1066MHz, otherwise you're better off with the cheaper and lower latency DDR2 modules. If the price is too high, get some generic (yes, generic are fine) DDR2 1066MHz sticks. They are great value for money.

Researching RAM

With RAM it's a matter of selecting the cheapest sticks with the highest clock speeds. Latency isn't much of a performance factor on modern platforms, so don't choose lower latency models if the cost is significantly greater. If overclocking, research benchmarks and user results.

The HDD/SSD (Hard Disk Drive/Solid State Drive)

The humble primary storage device comes in two consumer flavours, the HDD and SSD. See the boxout for a comparison.

Look out for the following when choosing a storage device:

Platter Density: Regarding HDDs, platter density refers to the capacity each platter holds. The greater the density, the faster the transfer speeds will be due to the minimal movement required by the read head.

Platter Speed: The speed at which the platter rotates is measured in RPM (Rotations Per Minute).

be fitted, and that the efficiency doesn't suffer. Factor in the efficiency of the PSU, an 80 per cent efficient 500W PSU is really only useful at 400W and under. Too much load on the PSU can cause failure.

Find a PSU with the correct wattage and 80-plus certification. This means the PSU is at least 80 per cent efficient.

Narrow down the search to high amperage (A) +12v rails.

firmware, and build quality are the main factors of performance, accuracy, and durability.

The Case

The case defines which components will fit (i.e. form factor), how many components will fit, and the quality of cooling if using air alone.

Cable management features: Some cases allow cabling to run under the motherboard, or they supply channels for cables to run through.

Searching for components is often complex because of the array of pricing across several stores.

What to research?

Research the amount of rails, efficiency, amperage, and wattage of PSUs in your price range. Online reviews and computer forums are informative sources to guide you.
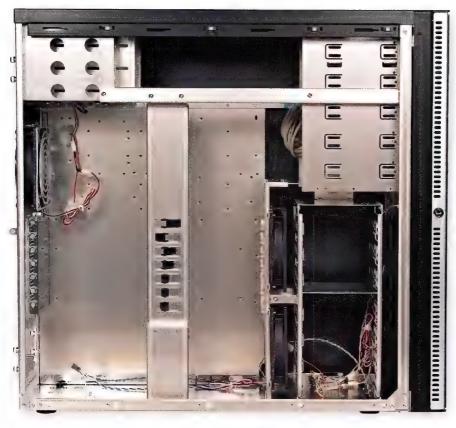
The Optical Drive

Optical drives are simple to choose, there's usually only one decent one at any particular time. For the last few years this has been the Pioneer range. This may change; the only way to select the best is to look at reviews and forum opinions. Apart from this, the write speed,

Neater cables help improve airflow.
Number of 5.25in bays: These can be converted to 3.5in bays for extra HDDs if need be.

Cooling/Airflow: Computer components need constantly circulating air to keep from overheating. Fan placement is important, as well as the number and wind pushing power (cfm) of the fans used.
Form factor: As stated above, the form factor defines the size of the components that will fit. e.g. ATX is smaller than E-ATX.

In the end, case choice comes down to

personal preference. Match the size of the components with the case. If the case is too small, then choose a larger one, otherwise look into smaller components.

Overall Component Selection

There are many peripherals to cover, so the following will explain a general method of component selection.

Take note of the specifications and outcomes you desire. With this information you can easily sort through the several products on offer. Research and sort through reviews, benchmarks and forum opinions. An example for a GTX280 GPU would be to search "GTX280 review" or "GTX280 benchmark" in a search engine.

Ensure that the products are compatible with existing components. This includes drivers for the OS or physical connections such as ports and expansion slots.

Searching for components is often complex because of the array of pricing across several stores. A solution to this is using a retail search engine such as StaticICE (**http://staticice. com.au/**).

If you're still stuck between a few products, search for comparisons. An example is "GTX280 vs 4870", which in this case is comparing the GTX280 with the 4870 GPU. Often forum threads will show up in the results – use this to compare user opinions.

Select, of what's left, the cheapest component with suitable warranty/support.

Putting it Together

Before purchasing your shiny new components it's important to consider their compatibility in terms of size, specifications, and power requirements – as outlined above. If in doubt, ask. The members of the Atomic forums are willing to help, just be polite and informative regarding your question.

When you've chosen all the parts, bought them, and examined their pretty boxes – it's time to build it! There are many guides on the internet to, well, guide you, or you can ask the kind gentlegeek at Atomic for some assistance. Just remember to have fun while constructing your awe-inspiring rig! **VC**

Keep your rig in a solid, dependable case to protect its soft silicon insides from harm.

HARDWARE

NEWS, REVIEWS AND ROUNDUPS ON THE LATEST HARDWARE

W e've got practically every PC base covered in this month's reviews, from the CPU at the heart of your system, to a case to put it all in – assuming you don't mind a bit of the light fantastic...

Two great new chips from Intel kick off the show, and we're mighty impressed at both offerings. We've got a mobo from EVGA and a swathe, a plethora, of graphics cards for all tastes, from budget beauties to dual-chip monsters. This month's case is from Thermaltake, and it has a... unique take on lighting. Is it good? Well, you'll have to judge that yourself.

We've also got the latest gaming mouse and keyboard from Microsoft, and two super-sexy, super-fast solid state drives from Intel and Patriot.

Finally, we've a round-up of budget 22in monitors. It's a great time for upgrading, and we pick the best of the pack for your gaming needs.

Core 2 Duo E8600

A Dual-Core CPU that promises to give you unrelenting speed.

Price $330   Supplier Intel   Website www.intel.com

Specifications 3.33 GHz dual core; 45nm manufacturing process; 'Wolfdale' core; 6MB(2x3MB) L2 cache; 10x multiplier; 1333MHz Front Side Bus; E0 stepping; 65W TDP.

For the past few years, Intel has been enjoying its status as the Top Dog in performance. With its aggressive Tick-Tock strategy releasing a new architecture one year, and then shrinking it down the next, performance is continually increasing – with no clear end in sight.

The E8600 is part of the Tick phase, and is a 45nm version of the original Core 2 Duo CPUs, albeit heavily tweaked. Running with a 1333MHz FSB (up on the 1066 of the original releases), this allows more bandwidth to the memory, as well as a higher operating speed. Cache has been bumped up as well, giving 6MB in total – more than enough for anyone's needs. With this newer process decreasing the manufacturing process, we don't see a similar drop in Thermal Design – remaining at 65W.

What's really special about this chip is the 10x multiplier – allowing for incredibly high overclocks without stressing the motherboard excessively. If you're into overclocking your system, this is definitely the CPU you'd want.

This CPU comes with a stock cooler, just like any other CPU you'd buy retail. However, this is definitely something you'll want to replace – weighing in at half the size of most normal coolers with a fan on top this is just adequate at cooling the chip at stock speeds, reaching 61 degrees at load and idling at 36. It's a good thing that it doesn't get too loud, hitting 52.5dBA maximum and 49dBA at idle.

Returning very nice results at stock speeds, we whacked our Thermalright Ultra 120 Extreme on and pumped up the FSB to 450MHz, giving us a speed of 4.5GHz. We had to increase the voltage to get here stably, using 1.45V, but this was stable through one hour of OCCT and can be run 24/7 without crashing.

This relatively easy overclock unlocked a whole new level of performance, shaving precious seconds off all benchmarks and adding a very nice number of points to the already fast benchmark scores. With all the extra speed this gave us, we were able to zip around in the usually chuggy Vista, and opening files and folders had a kick that we've not seen with any other CPU.

There has been some debate about whether to go Quad or Dual Core for gaming, but in this situation we really have to say that Dual Core is where it's at. For less than half the price of a comparable Quad CPU, performance is definitely there and overclockability is through the roof. We recommend this chip if you're after blistering performance, where it will be right at home in the beastliest of systems. **JR**

This relatively easy overclock unlocked a whole new level of performance, shaving precious seconds off all benchmarks...

Core 2 Duo E8600

	333x10; DDR2-1066 5-5-5-15	450x10; DDR2-1080 5-5-5-15 (1.45V)
CPU Free Benchmark2	20.0s	14.83s
wPrime 32M	43.325s	31.902s
Hexus Pi Fast	28.06s	22.03s
CineBench R10 64-bit – single thread	4118	5506
CineBench R10 64-bit – multi-thread	7994 (1.94x efficiency)	10739 (1.95x)
Everest Read	8036MB/s	9054MB/s
Everest Write	7084MB/s	9565MB/s
Everest Latency	70.6ns	62.1ns

Performance 96
The very top of the curve for this price.

Overclocking 94
4.5GHz stable under air. Rock solid.

Value 91
Great performance for far less than a Quad.

Overall
The chip to have for gamers and serious enthusiasts.

95%

Core 2 Quad Q8200

Intel's newest budget Quad put to the test.

Price $290 **Supplier** Intel **Website** www.intel.com
Specifications 2.33GHz quad core; 45nm manufacturing process; 'Yorkfield' core; 4MB(4x1MB) L2 cache; 7x multiplier; 1333MHz Front Side Bus; M1 stepping; 95W TDP.
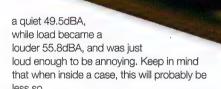
For many years, indeed from the start of modern computing, enthusiasts had been stuck with just the one core. Then things began to change. The Dual core arose, ushering in a new plateau of performance, as well as lifting that performance bar a little bit higher. And what we're looking at today is the culmination of all that effort of chips past – the Quad.

Manufactured on the 45nm process that Intel has been using for the rest of their current wave of chips, there are millions of transistors packed into a relatively small space. To give you an idea of this size – more than two million 45nm transistors can be packed on to the period at the end of this sentence. Four megabytes of L2 cache is divvied up between the cores, only a third of the Q9xxx series' twelve. A 95W TDP is similar to their other Quads, but due to the 'value'

market of this chip, it only has a 7x multiplier. This small multiplier coupled with the 1333FSB means that any overclocking will place a larger strain on the motherboard than usual – a P35 or newer board would be perfect for this, though.

As this is a budget chip, virtualisation

Whacking on the trusty TRUE, we pushed the FSB up to 486MHz and got the Q8200 to an impressive 3.4GHz.

Overclock me, baby!

Sometimes you either can't afford aftermarket cooling, or just don't want to change. Well, the good news is that you can overclock with the stock heatsink. We managed to squeeze out 2.85GHz at an FSB of 407, completely stable, so you should be able to get close to this quite easily.

technology has also been stripped from the CPU – if you run virtual machines then look elsewhere.

This CPU comes with the usual Intel stock cooler, but with one important difference. There is a copper slug inserted as the base of the cooler, improving the heat transfer. While we couldn't measure the temperatures (the Q8200 is so new that it wouldn't detect properly), we did manage to grab the sound levels. Idle sat at

a quiet 49.5dBA, while load became a louder 55.8dBA, and was just loud enough to be annoying. Keep in mind that when inside a case, this will probably be less so.

Whacking on the trusty TRUE, we pushed the FSB up to 486MHz and got the Q8200 to an impressive 3.4GHz, which is pretty amazing for a CPU with such a low multiplier. From a touch-test of the heatsink (to see how warm it was under load) it remained surprisingly cool, even when overclocked and under intense load.

This CPU is a great choice for those with a budget who want to get into Quad cores, without the heat or difficulty of most others. While it might not have the best multiplier or cache, for any gamer or hardcore user, this chip is one that won't disappoint – especially if you can get it under $300. **JR**

Core 2 Quad Q8200

	333x7; DDR3-1066	486x10; DDR3-1554 (1.425 core V)
CPU Free Benchmark2	28.56s	19.60s
wPrime 32M	61.855s	42.586s
Hexus Pi Fast	41.04s	30.34s
CineBench R10 64-bit – single thread	2806	3970
CineBench R10 64-bit – multi-thread	10092 (3.60x efficiency)	13985 (3.52x)
Everest Read	8001MB/s	10202MB/s
Everest Write	7028MB/s	7352MB/s
Everest Latency	71.3ns	70.8ns

Performance 75
Solid even at stock, especially for the price.

Bundle 88
Far better than we expected.

Value 85
Shop around, but this is still good priced chip.

Overall
A winner for any gamer or money-conscious enthusiast.

84%

eVGA 790i Ultra

An imposing black mobo, teasing you with sweet promises of SLI...

Price $425 **Supplier** Altech
Website www.altech.com.au
Specifications Socket LGA775; NVIDIA 790i chipset; ATX form factor; 3x PCIe x16; 2x PCI; 2x PCIe x1; 1x EIDE; 6x SATA; 1600MHz FSB; DDR3-2000

As the slightly odd first part of this page (up there) might have given away, this is indeed an SLI-ready board. Plugged into this board is the NVIDIA 790i chipset, enabling the use of multiple NVIDIA cards at once, as well as supporting DDR3-2000, though only in two slots at a time.

Speaking of slots, these are positioned just far enough away from the CPU socket that you can install large coolers, and high enough that you can install and remove the modules without moving the graphics card first. The actual CPU socket is unfortunately quite cramped, and our TRUE could only be installed with the fan pointing towards what would be the top of the case, as well as being a tight squeeze to install. Luckily the 24 and 8-pin power connectors are placed in easy-to-reach locations, and remain out of the way of airflow.

Sliding down the right hand side of the mobo brings us to an IDE header, and a right-angled FDD header – this would have made much

The front panel headers are in the very bottom right corner, as well as a serial port header (please, let this interface die already!), two USB headers and a Firewire header. Power and Reset buttons are also present, as well as a mobo-mounted speaker which is invaluable

but then again you wouldn't be reading this if you were into 'just enough'.

Overclocking of this board was pretty damn solid, with performance increasing more or less linearly, hitting a max FSB of 466, giving us an effective 4.2GHz on our test rig. The BIOS is slightly convoluted when it comes to getting into the overclocking settings, but once there it is easy to use and quite comprehensive.

The only down side to this board (apart from the lack of solid capacitors across it) is the price, though for the money you'll be buying a solid DDR3-based board that can handle SLI – what more could you want? **JR**

The BIOS is slightly convoluted when it comes to getting into the overclocking settings, but once there it is easy to use...
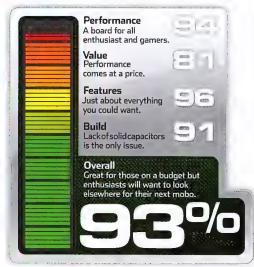
more sense if they were swapped around, as FDDs are few and far between. Four SATA ports are adjacent to the RAM slots, and a further two are right-angled just below the IDE – all are accessible when long graphics cards are installed. A small LED post screen is nestled in the bottom corner of the board as well, and allows you to troubleshoot booting problems, though doesn't display anything interesting under normal use. Unless you find a glowing "FF" message entertaining that is!

for cases that don't include them – or even when you're benching without a case. The audio header is in a good spot down the bottom left corner of the board.

Moving upwards from here to the expansion slots, there are plenty of options. Possibly the most exciting one of these is the ability to run three dual-slot graphics cards in Triple SLI, as well as another card such as a TV tuner or hardware RAID card in the top 1x slot. Of course, we'd be tempted to call that overkill,

eVGA 790i Ultra

	333x9; DDR3-1066 5-5-5-15	378x9; DDR3-1008 5-5-5-15	423x9; DDR3-1015 5-5-5-15
CPU Free Benchmark2	22.37s	20.01s	17.51s
wPrime 32M	48.787s	42.403s	37.925s
CineBench R10 64-bit – single thread	3690	4204	4629
CineBench R10 64-bit – multi-thread	7144 (1.94x efficiency)	8171 (1.94x)	9047 (1.95x)

Performance 94
A board for all enthusiast and gamers.

Value 81
Performance comes at a price.

Features 96
Just about everything you could want.

Build 91
Lack of solid capacitors is the only issue.

Overall
Great for those on a budget but enthusiasts will want to look elsewhere for their next mobo.

93%

HIS HD4870X2

The closest to a Dual-Core graphics card that you can buy.

Price $669 **Supplier** HIS **Website** www.hisdigital.com/
Specifications 750MHz core; 900MHz memory
(1800MHz effective); RV770 core X 2; 1600 shader units;
2GB GDDR5; 256-bit memory interface; dual slot PCB with
active cooling; 6-pin and 8-pin PCIe power connectors

Following on from last month's review of a non-branded reference board, when HIS sent us one of these giant cards, we had a revisit to put the retail version through its paces.

Containing two RV770 cores connected via a PCI Express bridging chip in between, this card has a massive 2GB of GDDR5 memory running with a 256-bit memory bus. This huge amount of speed affords the card an insane amount of memory bandwidth, and with each core effectively getting 1GB of memory there's plenty of room for textures here too. The HIS card runs at stock speeds, but this is able to be overclocked slightly if that's your poison.

The cooler is the standard affair, a long red and black whale, unceremoniously tied down to both cores to suck away the immense heat generated by what is effectively two whole cards

Temp Management

If you don't care about warranty, an effective way of both voiding it and improving your temperatures is to take off the stock cooler and clean off the existing thermal goop (isopropyl alcohol is handy for this), and replace with a thin coating of your favourite paste. You should be able to shave a few degrees off your temps quite easily this way – but again, you'll lose any warranty if you do it wrong.

in one, like some deep-sea leviathan sucking down krill. HIS has a small sticker on the fan – other than this there's no way to tell the brand. Handy if you're not fond of large and loud logos on your gear. Thankfully the cooler vents most of the heat out the back of the system, so the heat does not build up as significantly inside the case.

Temps do get quite toasty though, idling at 65 degrees and 50.7dBA, with a load of 78 degrees and 66.7dBA.

Performance (as you would assume) is very nice, with good scores in both 3DMark programs and *Company of Heroes*, though *Crysis* does take a performance hit due to driver issues. This is one of the fundamental problems

with this card, in that close driver support is essential for two cores to work together well for a game. The good news is that a single core is usually fast enough for most games, so you shouldn't get horrible performance – just not the best.

Accessories are the usual power cables, and no game, but HIS have thrown in a handy multipurpose screwdriver/LED torch/level (yes, you can use this to check if things are flat) to sweeten the deal.

If you're after the best performance out of a single card, or simply want to extend your e-peen to epic proportions, a HIS 4870X2 is definitely a card to look for. **JR**

HIS HD4870X2 *3d Mark scores*

- 3DMark 06 – 16382
- 3DMark Vantage – P12497

HIS HD4870X2 *Gaming Benchmarks*

Crysis
- Average 36.72
- Minimum 21.47
- Maximum 57.87

Company of Heroes
- Average 56.60
- Minimum 31.40
- Maximum 63.00

Performance 98
Stops just short of lightspeed.

Bundle 82
A game would be nice, but you do get some extras.

Value 85
Expensive, but really, it's worth it.

Build 60
Not a lot of room for tweaking here.

Overall
We are totally ATI's bitches these days.

91%

Palit HD4850 Sonic

We half expect this card to transform into Soundwave...

Price $250 **Supplier** Palit **Website** www.palit.biz/en/
Specifications 685MHz core; 1000MHz memory (2000MHz effective); RV770 PRO core; 800 shader units; 512MB GDDR3; 256-bit memory interface; dual slot PCB with active cooling; 8-pin PCIe power connector

When we opened the packaging to this card, we half-expected one of our favourite Transformers to leap out and begin wreaking delicious Decepticon destruction on our Labs. While this may have happened only in our minds, what we did get out of the box was something rather cool anyway.

We've taken a liking to the RV770 PRO core that runs in this card, in this case with a core frequency that's been overclocked by a rather insane 60MHz up from stock – for a factory overclocked card this is very good. Memory speeds haven't increased by much, with only a small bump up over the stock 993MHz, but this still affords the card more than enough bandwidth to get information to the 512MB of GDDR3 memory available.

But the real drawcard of the Sonic isn't the tender graphical guts inside, but instead the cooler. This is a dual-heatpiped, large-fanned cooler, with a large amount of aluminium fins to dissipate the heat away from this warm-running card. The air from the central fan is guided over these fins by a smoky black plastic guide that only adds to the card's visual appeal. Unfortunately this cooler doesn't touch the memory at all, though there is airflow directed at it.

The cooler does an admirable job of keeping temperatures controlled as well, idling at 46 degrees and hitting a load of 64 (in Issue 92 we recorded an idle of 61 and load of 82, so this is a huge improvement). Sound levels remained quite low too, with 48.9dBA idle and 51dBA load betraying the Sonic's name; this is great for anyone who loves a quiet computer while watching movies, or playing games.

And if you do decide to play games, this card has you covered. *Crysis* provides some good stable framerates, and *CoH* is also solid, though there is a strange dip down in performance – most likely due to driver issues. Our 3DMark benchies were also quite impressive, with solid scores that you could easily push higher again with a bit of tweaking, and even at default clocks this card pulls in with an extra 700 3DMark06 points.

One of the features of this card (that you may have noticed already if you read the 'Specifications' at the top of the review) is that it comes with an 8-pin connector instead of the usual 6-pin. This was done to increase stability when overclocking, though we haven't tested it properly yet. The good news is that those with power supplies that don't have one of these connectors can use the included adaptor to give an extra two pins to the card.
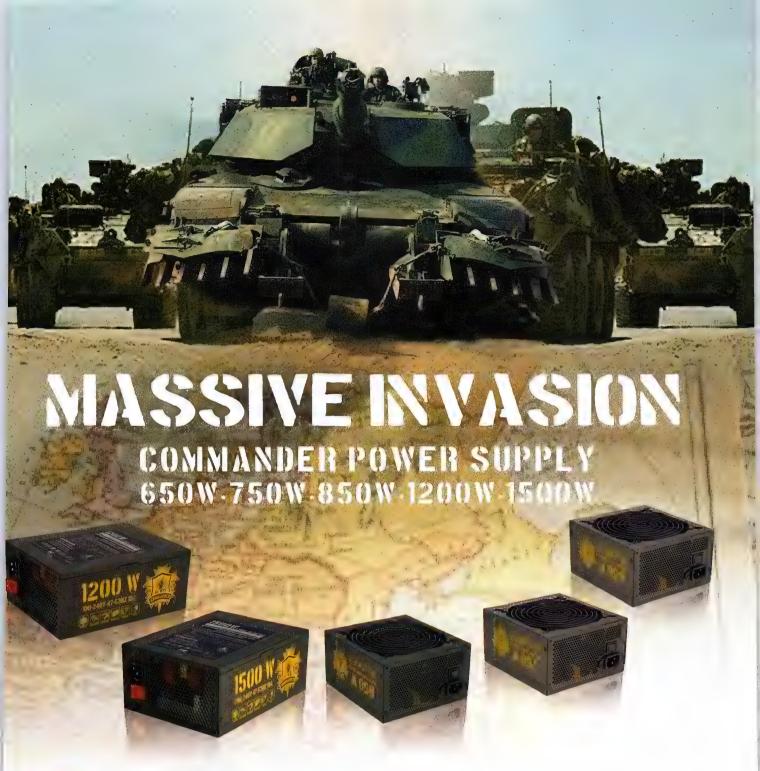
The bundle is rather light, with that cable, two DVI adaptors (one HDMI, one VGA) and a driver disc. No game is included with this card.

For a factory-overclocked, aftermarket-heatsinked well-performing card, this is a very solid choice that won't break your budget. **JR**

Palit HD4850 Sonic *3d Mark scores*

- 3DMark 06 – 13238
- 3DMark Vantage – P7569

Palit HD4850 Sonic *Gaming Benchmarks*

Crysis
- Average 39.34
- Minimum 24.10
- Maximum 48.92

Company of Heroes
- Average 51.3
- Minimum 1.9
- Maximum 62.30

Performance 92
A solid overclock for solid performance.

Bundle 80
We would have liked to see a game...

Value 83
Not quite budget, but very close.

Build 89
Well-designed and quiet to boot.

Overall
Not the perfect card and bundle, but still one that can't be ignored.

90%

XFX 9800GTX+

Good things come in incredibly large packages.

Price $319 **Supplier** XFX **Website** www.xfxforce.com
Specifications 765MHz core; 1100MHz (2200MHz effective) memory; 1898MHz shader; G92b core; 128 stream processors; 512MB GDDR3; 256-bit memory interface; dual-slot active cooler; two six-pin power connectors.

A midst the chaos of our site redesign and mag reworking, we had a package turn up on our doorstep in the middle of a hectic amount of running around and some occasional swearing. So when we got some spare time, we decided to give this card some much-needed loving.

And some loving it deserves, with an imposing size and glossy black plastic cooler. Covered with a sticker depicting some kind of ethereal lightning powered engine, this is a reference-designed board, so we can't really expect all that much variation or surprises. That is, apart from the LED on the PCI bracket, whose only function seems to be lighting up green if the card has sufficient power, and red if it does not. This serves to slightly pimp up the back of your computer, though it is ultimately quite pointless. Unlike the GTX200 series cards, the back of this card is laid bare – this might prove to decrease temperatures slightly, but it's much of a muchness.

The whole package is kept rather cool by the stock cooler, idling at 43 and peaking at 58, generating 52dBA and 59.5dBA respectively. This is mostly due to the 55nm revision of the G92 core, which is more power efficient and therefore generates a lot less heat. This has also allowed XFX to bump up the stock frequencies

to 765MHz, a reasonable 27MHz performance increase. Memory is stock, however, but is more than fast enough with an effective 2200MHz on a 256-bit bus, with 512MB of GDDR3 providing ample space for most games on the market now.

Gaming performance is pretty good, with solid framerates in both *CoH* and *Crysis*. Both 3DMark programs were also rather good, returning scores that would have made benchmarkers from a few years ago wet themselves.

Included in the bundle is a driver disc, the

usual adapters for VGA to DVI, and a PCIe 8-pin to 6-pin cable – great for those running power supplies with hardwired 8-pin PCIe power cables. No game is present (seems to be the flavour this month...), which is slightly annoying, as it doesn't cost too much more to throw one in. Nonetheless, the package still feels complete without one.
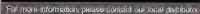
If you're in the market for a pre-overclocked card, or want another one to chuck in SLI, this card is a great choice – provided you can pick it up at a good price. If you were looking to buy a card new standalone card we'd suggest something else, but for what it is this card is pretty damn solid. **JR**

XFX 9800GTX+ *3d Mark scores*

- 3DMark 06 – 14128
- 3DMark Vantage – P6798

XFX 9800GTX+ *Gaming Benchmarks*

Crysis
- Average 41.91
- Minimum 25.60
- Maximum 52.63

Company of Heroes
- Average 52.70
- Minimum 39.00
- Maximum 61.80

Performance
The 9-series still has it where it counts. **88**

Bundle
It's a pretty bare package overall. **75**

Value
Good for the performance. **83**

Build
Cool and well built. **80**

Overall
The 9-series may be overshadowed by more modern cards, but there's still life in the range yet.

82%

ASUS EN9600GT Matrix

There is no spoon.

With another month rolling past, we received yet another 9600GT. This card has seen huge popularity with gamers who want good performance on the cheap, and it's proved to be relatively overclockable too. So when ASUS sent us this decidedly funky-looking card, we knew we just had to have another look.

The main drawcard of the Matrix is right beside this text. Go on, have a look at it. We can wait. From the dual-heatpipes leading to the internal cooling fins, to the curved heatpipe with fins around the circumference and a fan in the middle, to the imposing black and silver colour scheme, this is a card that looks like it means business. The cooler is drenched in quality and will look bloody amazing in any windowed case, even managing to look as visually impressive from the top as it does from the front. But this cooler isn't just for dead sexy looks, it also does a great job of cooling the card – idling at

drown out the racket.

This card is built around the G94 core running at stock frequencies of 650MHz for the core and 900MHz for the memory, this card also has a 256-bit memory bus feeding 512MB of GDDR3 RAM, which should afford you plenty

Performance in gaming is quite good, giving you a decent playing experience with the standard settings on our usual benchmark, and even better if you tweak them down a bit. The G94 core does chug a bit during some areas in both games, but is for the most part pretty smooth. Both 3DMark benchmark programs are quite smooth as well, returning some nice scores.

The bundle is quite normal, supplying only the usual cables. The back of the card already has a hardware HDMI port, as well as optical out, but we'd like to have seen a HDMI to DVI converter included for those with existing dual-monitor setups who would like to keep it simple. There is no game included.

While newer cards have since come onto the market, this card is still a tempting offer that can deliver good performance and overclockability.
JR

The core is extremely overclockable too, with the cooler doing an excellent job...

35 degrees and load at only 44 degrees, an impressively slight nine degree increase!

This does come at a sacrifice of noise, however, idling at a rather loud 63.4dBA and hitting 68.8dBA at load. You would definitely want to have headphones with this card, to

of room to play most games, and even have a play around with texture packs (if you're into that kind of thing). This core is extremely overclockable too, and with the cooler doing an excellent job of keeping temperatures in check you can expect to push this card very far – and keep it there.

ASUS EN9600GT Matrix *3d Mark scores*

3DMark 06 – 11094

3DMark Vantage – P4570

ASUS EN9600GT Matrix *Gaming Benchmarks*

Crysis
Average 28.41
Minimum 14.55
Maximum 31.59

Company of Heroes
Average 36.00
Minimum 19.90
Maximum 60.50

Performance 80
Not the fastest card on the market. Still solid.

Bundle 79
Would a game be so hard, people?!?

Value 77
Low price, but not a lot for it.

Build 95
Lots of room for overlocking.

Overall
A good cheap card for the tweakers out there, with decent stock peformance.

86%

Zotac 9500GT Zone Edition

Proof that lumps of metal can have form and function.

Price $115 **Supplier** Zotac **Website** www.zotac.com
Specifications 550MHz core; 800MHz memory (1600MHz effective); 1375MHz shader; G96 core; 32 stream processors; 512MB GDDR3; 128-bit memory interface; dual slot PCB with passive cooling.

For the third month in a row, we have another 9500GT. Is this the one that will finally win our approval?

Running the G96 core with 32 stream processors at a clock of 550MHz, this is a pretty standard offering. That is, until you look at the speed of the memory – bumped up 300MHz over the reference card to give you an effective 1600MHz memory speed. This is due to the card's 'Zone' branding, indicating that it is a thoroughly tweaked card with a serious overclock. There is 512MB of memory here too, plenty for most users, and certainly will not hold you back – the core is the bottleneck here.

The PCI bracket of the card is anodized a gunmetal grey colour, and the dual DVI ports are a fluoro yellow that look quite snazzy. The PCB is more or less aqua, and has a SPDIF port to allow the included DVI>HDMI adaptor to transmit sound. Perhaps the coolest part of this card however is the silver passive cooler. With

Noise Measurements: where are they?

One of the great things about a passive cooler is just that – it's passive! This means that the card will not make any of the usual whirring noises you'd expect from cards, and certainly nothing as loud as the Leadtek 9500GT from Issue 93.

a large number of thick fins, and plenty of spacing between them, this allows the card to be cooled without added airflow. We tested this on our testbed, and recorded an idle temp of 47, and a load of 62. This even allows for some overclocking, and your temps will most likely be lower in a case due to the more focused wind tunnel of moving air.

This card's performance is, on average, about half a frame per second faster than previous variants, most likely due to the significant memory speed increase. Game performance is rather poor, but you wouldn't really buy this card for that – home theatre is where this card is really suited. Whack one of these silent beasties

in your 'puter, and you'll be able to enjoy HD movies and infrequent gaming at a hugely reduced noise level.

The bundle with this card is pretty decent too, with all the cables you'd need to attach it to a TV or monitor. No external power is needed, as this can be sucked out of the PCIe slot without too much fuss. Sadly, no game is included to satiate your game-lust, but it does come with an extended five year warranty – just register the card on the Zotac website within two weeks of purchasing. This is bloody good, and something that few manufacturers do.

So you're getting a passively cooled, overclocked, five-year-warrantied card for a reasonable price, and we think this is something definitely worth considering for any quiet computer. **JR**

Zotac 9500GT Zone edition *3d Mark scores*

3DMark 06 – **6026**

3DMark Vantage – **P2035**

Zotac 9500GT Zone edition *Gaming Benchmarks*

Crysis
Average **12.94**
Minimum **6.33**
Maximum **13.95**

Company of Heroes
Average **17.90**
Minimum **9.40**
Maximum **37.40**

Performance `68`
Not great, but on par for the chip.

Bundle `81`
No game hurts, but all cabling options present.

Value `80`
A great option for non-performance systems.

Build `88`
A well engineered and very cool card.

Overall
If sound – or the lack thereof – is your greatest concern, this is the card for you.

82%

ASUS Lion Square

May or may not contain real milk, nuts, or lion.

Price $69 Supplier ASUS Website www.asus.com
Specifications Tower cooler; four 8mm heatpipes; 92mm
fan with vapo bearing and PWM

The name of a product is usually quite functional, from a toaster to a knife these names tell you what they do; but the ASUS Lion Square is one product that bucks traditional names. This, in other words, is ASUS placing its own spin on the heatsink scene. Named after the 'Legend of the Sword Lion', the entire box seems to show this traditional Chinese theme in one way or another, from the bold red and black colours, to the glossy gold and black highlights.

The cooler comes sandwiched between two formed pieces of plastic that hold the cooler and accessories snugly, and it is very unlikely that it will get damaged during shipping. Included with the cooler is a small tube of ASUS-branded thermal goop, an LGA775 mounting bracket and screws, and an AM2 socket clip. You'll have to take out the motherboard if you're installing this on an Intel platform, but you can leave it in for an AMD system.

Thirty four thick aluminium fins are supported by a group of four heatpipes bent into a 'U' shape, effectively giving eight. Grooves are left out of the fins in four corners, allowing room to get a screwdriver in to install the heatsink, and all the fins are angled down to blow some cool air over the power regulation on the motherboard. The base of the cooler is

The blue light seeping out of the cooler lights up the fins and surrounding motherboard...

smaller than most coolers, but still quite thick. Unfortunately the base is not polished to a mirror shine, with machining marks still clearly visible, but it is pretty flat and should make good contact with the CPU.

At the top of the Lion Square is a black plastic covering with an image of, well, a lion. All the heatpipe ends are capped with metallic pieces – this doesn't improve performance,

but it does help the uniformity of the top of the heatsink. Nestled deep within this heatsink (just under the top piece) is a 92mm blue LED fan that idles at 52.8dBA and hits 56dBA under load – similar to many graphics cards in terms of noise. The blue light seeping out of the cooler lights up the fins and surrounding motherboard; those with windowed cases looking for something that looks extremely interesting should definitely grab one of

these simply for looks alone.

Firing up our stress-test program on a 65nm QX6850 we found that temperatures recorded at stock settings were pretty good, with an idle at only five degrees higher than the TRUE. Load temperatures were actually a degree cooler here, a trend that (amazingly) continued when the chip was overclocked – besting even the TRUE in both load and idle temperatures. The included fan managed to move a significant amount of air – the airflow could still be felt up to a few feet away from the cooler.

A great looking cooler, with performance better than the previous best and an included fan. What's not to like? **JR**

ASUS LION SQUARE

	ASUS Lion Square		Thermalright Ultra 120 Extreme	
	Load	Idle	Load	Idle
3GHz, 1.325V	56	35	57	30
3.66GHz, 1.45V	70	42	71	43

Overall
This is a heatsink that ticks all the boxes, and does so with gusto.

96%

Thermaltake M9D

Thermaltake bring another light and breezy, blinged up case to market.

Price $129 Supplier Anyware
Website www.anyware.com.au

Specifications 442 x 200 x 503mm (H x W x D); 1x 120mm fan (front), 1x 120mm fan (rear), 1x 230mm fan (side panel); 3x 3.5in drive bays, 6x 5.25in drive bays; micro ATX, ATX; black SECC and aluminium, acrylic side panel.

There's an adage that goes you only ever get what you pay for, and it's a saying that's particularly true when it comes to PC cases. You can spend as little – or less than! - $100 to get a case, or go all out and spend well over $500, and the range of neat extras on the higher end cases is nothing short of mind-boggling. But does that mean, then, that cheap cases have to be, you know... cheap?

Thermaltake would say no, and part of its evidence for the defence would be the M9D. It's on the small side of being an ATX case, so a lot of enthusiast-grade users will already be rolling their eyes and patting their Lian Li's or Silverstone's for good luck. But there's some style in this little case, we have to admit, as well as some truth to the idea that cheap is as cheap does.

The big selling point of the case is the acrylic window panel and mounted 230mm LED fan. It's certainly plastered all over the cases packaging. The fan is big, to be sure, and we do like windows, it must be said, but there's something that's just too... nasty about this one. It's just cheap clear plastic, with a faux frosted inset of the Thermaltake logo and motto (which might be a deal killer right there if you're not that brand-fanatical), and a big cheap fan. It's noisy, too, even without being attached the rest of the case, constantly buzzing away as it pushes a middling amount of air. It also lights up,

with a push button in the window's lowest corner that allows you to switch from red, to blue, to green (okay, we like the green) to a pulsing combination of all three. The flashing is nothing short of annoying, though we're sure there are some people out there who'll find the psychedelic-like effect quite soothing – just not us. There are two more, more standard, 120mm fans mounted at the front, on the HDD cage, and at the rear.

The rest of the case's construction is similarly slight. It is light, at least, but not in a good way. The interior is quite bare of supports, so is at least uncluttered, and there are tool-less mechanisms for securing both 5.25in drives and graphics and expansion cards. This latter mechanism, a sliding ratchet of sorts, is actually quite elegant, really, so if you do a lot of swapping out of cards, there's something about this case that may appeal. The HDD cage, however, itself secured in a tool-less manner, still requires screws for the placing of drives. In this case, if you're not the kind of person to swap drives in and out, it's not a problem.
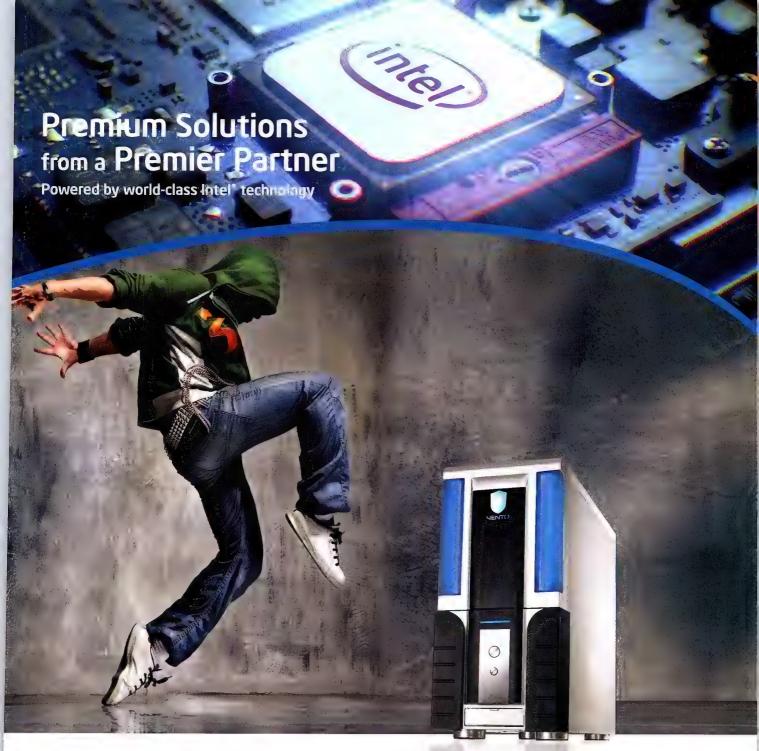
The M9D comes with all the screws and cables, at least, and you'll be able to achieve a lot of clearance off the back-plate to run cabling securely underneath your mobo, but overall this is a tough case to recommend. The front fascia has a kind of modern chic going for it, but the cheap lighting, loud fan, and average build quality leave it sitting behind other cases at the same price-point. **DH**

Build 69
Solid, if unimaginative. Noisy fans, though.

Value 79
Cheap, but still not a value proposition.

Cooling 77
Adequate, but not for enthusiasts.

Features 76
Not quite tool-less enough.

Overall
It's not a bad case, but it's hard to get excited about.

72%

Microsoft Sidewinder X6 Gaming Keyboard

A transforming keyboard with a mess of gaming features? Colour us mighty curious...

Price $149.95 **Supplier** Microsoft
Website www.microsoft.com.au

Microsoft has always seemed an odd choice as a gaming peripheral maker, seeming only interested in the area as, more or less, an afterthought. Recently though, the Redmond Beast has been delivering some pretty unique – if not quite solid – efforts in the area. This new keyboard is yet another step in the right direction – but it's not quite there yet.

Probably the biggest feature of the X6 is its optional and swappable number pad. You can switch this from the standard right to the left-hand side of the keyboard, and in doing so the number pad then becomes an extension of the keyboard's inbuilt macro function. The pad attaches via a couple of pretty strong magnets, and we found the whole set-up to be very sturdy. The keyboard also works perfectly well without the number pad, becoming instead a short form-factor 'board without losing the vital cursor and function keys.

It looks the part, too, with all the keys being beautifully backlit in red, which also lights up

each character. We've not yet met a hardcore gamer who can't find WASD even under the harshest of circumstances, but it's still an attractive touch.

Apart from the wheels, the top edge houses a mess of cool controls. Probably the most important – and useful – is the Macro key. Programming macros on the fly is a godsend in games like MMOs, and the X6 makes the process super easy. Hit the key, perform your tasks, assign it to one of six dual-numbered macro keys. You can toggle these keys, so that's 12 macro functions there, not counting the fact you can move the number pad over to serve as well. It's one of those things that just works, and works well.

Unfortunately, without any onboard memory, those functions only work while attached to your home machine. It's a minor niggle, but when you combine that with a less than smooth key action (and a too small Ctrl key) and a lack of feet to alter the angle at which you

type, and the X6 becomes not quite perfect. It's still a solid choice, however, for those looking for an alternative to the huge – though less expensive – gaming models from Logitech and co. **DH**

Overall
A great keyboard let down by small faults and a large price.

77%

Intel X25-M SSD

The fastest Solid State Drive there is.

Price US$595 **Supplier** Intel **Website** www.intel.com
Specifications 80GB; 2.5in form factor; SATA 3Gb/s.

Intel is not a name that you immediately think of when talking about storage, but anyone who's anyone knows the big chip-making giant. With the CPU market tucked firmly in its belt, can Intel also grab hold of the high-performance storage market?

Intel's X25-M SSD is in the traditional 2.5in laptop form factor, and uses the standard SATA power and data cables that most hard drives use today. It's about one centimeter thick, and about one and a third the size of a business card. In other words – bloody small. There isn't a lot of weight in the SSD either, feeling more like a few USB sticks rather than a larger drive – probably because they share so much in common.

Intel has developed a special type of NAND just for this product. Made on a 50nm manufacturing process (only 5nm larger than their current CPUs), this allows 80GB of memory chips to be placed in this small form factor. While only 74.5GB of this space is actually usable once

the drive has been formatted, this is still plenty of room for an Operating System and some games.

But it's not the space that you'd buy this for – it's the speed. We recorded an average speed of 228.3MB/s – twice that of the WD Velociraptor's average of 110. The speed hit a ceiling at a blistering 261.93MB/s, with access times at a certifiably insane 0.1ms. With no platters to spin up, this drive can practically work at the speed of electricity (though there is some overhead from the components communicating with each other).

We found that under use, there was simply no wait for the drive. Folders with hundreds of files opened instantly, each name loaded. The dreaded Vista photo viewer that usually takes ten seconds to load anything popped up in less than a second, and we were able to flick through photos without having to wait at all. Even our games loaded appreciably faster, with a few seconds shaved off the loading times – think of all the time you'll save if you game often!

The drive didn't get hot under load, nor did it

make any noise at all. It did warm up, but only to the level that a USB stick would – we were too disturbed at the lack of whirring platters to notice.

If you're serious about performance, and want the absolute best you can buy right now, the X25-M is definitely the drive to get – if you can afford it. **JR**

Overall

91%

Microsoft Sidewinder X5 Gaming Mouse

The perfect complement to the X6, or just another mousing also-ran?

Price $99.95 **Supplier** Microsoft
Website www.microsoft.com.au

The previous Sidewinder had the who's who of gaming mouse features. It had optional weights, an LCD readout to display DPI changes, interchangeable feet... the list goes on. The X5 uses the same basic design – though it is much comfier now – and strips out a lot of those shiny extras.

Instead, the X5 simply works well on its own merits.

Our hand simply wrapped around the mouse like it was made for it. While we admit our hand may not be the platonic ideal of hands, it's still a pretty impressive piece of design. The slight curves around the depression that holds your thumb, for instance, allow for excellent grip. The high rear portion takes the weight of your palm, leaving fingers free to manipulate the controls. Even without the fancy weight counters, it's still a lot easier to mouse with.

As for the gaming features it does have, you can switch between three DPI settings on the fly, and there's a more or less useless button to access various gaming features in Vista. The two buttons that rest under your thumb browse back and forth between pages when web browsing, and actually feel a lot more responsive than the metal ones on the previous model. It's a similar story with the mousewheel – it was metal, and free rolling, and is now plastic with the usual clicky feedback we've all come to depend on when switching from your Colt sidearm to your G3 rifle in a *Call of Duty 4* session. Gamers should JUST SAY NO to free-rolling mouse wheels.

If we had to choose between this mouse and the Cybersnipa reviewed in issue 91, the X5 is the better ergonomic choice, at least for Atomic-sized hands, and even though it lacks the features of many of its brethren, it makes for an accurate and comfortable gaming experience. Of course, it's also an expensive one, by a large margin. If you've money to burn, this might be the mouse for you. **DH**

Overall
A great gaming mouse that doesn't hurt your hands, but does hurt your wallet.

71%

Patriot Warp SSD 128GB

Not quite as fast as the fastest, but has a lot more wiggle room.

Price $569 **Supplier** Patriot
Website www.patriotmem.com
Specifications 128GB; 2.5in form factor; SATA 3Gb/s.

Patriot, long held in reverence for its dependable memory at decent prices, is the second player in the consumer SSD market that we've seen. Does its attempt at a storage device rival their mastery of memory?

In the compact (some might even call it 'sporty') 2.5in form factor, the drive is about 1.5cm thick, and is again slightly larger than a business card. Weighing in at only 91g, this is lighter than most MP3 players, and is built very solidly – though don't go throwing it around.

The interface is the one we all know and love – SATA. You'll receive this drive packaged just like a stick of RAM, inside a specially moulded plastic shell that holds the drive firmly in place – safe from potential damage. There is no adapter included in the retail packaging that would allow an increase from 2.5in to the standard 3.25in, which would have been nice, but the good thing is that it is so light you can screw it in damn near anywhere that there is space for it.

Filled with NAND chips (albeit slower than Intel's), you get a relatively large 128GB of space – this is whittled down to 119GB when formatted. An average transfer speed of 136.9MB/s was recorded, 19 per cent faster than the WD Velociraptor. Maximum speeds peaked at 161.93MB/s, with latency at a respectable 0.2ms. This is still very fast, and is a notable improvement over traditional hard drives that can take much more time to begin moving.

Compared to the Velociraptor, this drive had a marginally noticeable speed increase in game loading times, as well as boot times for the OS. Browsing the usually slow filesystem was much improved; never again will you have to wait for the drive to start moving to access files. The unit itself even managed to remain cool when under heavy stress from our benchmarks, with no noticeable temperature increase at all – though it did make faint beeps and blips when being accessed (similar to an icecream truck, but with random noises instead of Green Sleeves). This wasn't loud enough to be heard further than ten centimeters away; for the most part the Warp was inaudible.

The Warp has the largest amount of storage space that SSD's currently reach, and a speed that tops the current champion in the traditional HDD market. For the price, this is a great way to access solid state computing with just enough storage space to make it worthwhile – great for a laptop upgrade. We'd definitely want one of these in our rigs. **JR**

Overall
Not as fast as Intel's offering, but still a leap ahead of traditional drives.

84%

Acer Aspire Predator G7700

Striking looks, but can it perform where it counts?

Price $6.724 Supplier Acer
Website www.acer.com.au

Specifications Intel C2Q Extreme QX9650 (3GHz); 4x 2GB DDR2-800 RAM; 2x 750GB 7200rpm HDDs; BluRay Uni Optical Drive (Reads BD,HD-DVD); 2x 9800GTX 512MB (in SLI); Logitech G15 (Only available on first 50 buyers); Logitech gaming mouse G5; Vista Home Premium Edition (64-bit), 22in Acer LCD.

Look at that thing. Just take a moment. Even if you don't like the Predator's design (and we can understand that), you've got to admit that Acer has created a case that is truly unique and striking, a real cut above the square box mentality of most case designs.

What's more, it's thoughtfully designed from a technical point of view, as well.

The sliding front panel, which we hate on other cases, is actually quite solid on the Predator. It's well anchored and never ever feels like it's going to snap or foul its mechanism, and it looks as good raised as it does lowered (and neither position obscures the front IO ports).

With the panel raised, the real working fascia of the Predator is exposed. Here you have two bays for optical drives, and quite a fancy opening mechanism, and another panel door that reveals four hot-swappable HDD bays. The OS disk is clearly labelled, and in this model there's only a second drive, but the room for expansion is ideal. The slide-in slide-out mechanism housing the drives is well designed, too, making this a feature that's easy to use.

The interior is very neat, and all the major components feature airflow guides to make sure intake and exhaust goes where it should. Combined with the water-cooling system keeping the CPU chilled, this means getting to stuff like RAM is a little more convoluted than we like, but

certainly not a chore. The cabling is neat, though perhaps not as anal as we've come to expect from smaller builders like Scorptech and NRG.

The watercooling is an excellent addition. With a QX9650 under the hood, the Predator is actually an excellent 'first overclocker's' machine. It's supplied at stock (presumably, Acer is planning to build a lot of these, and doesn't want to mess about with a stock OC), but there's ample room for getting your hands dirty. Like a lot of higher end builders, there's a range of graphics options for the Predator, but this one comes with dual 9800 GTXs, with a total of 1GB of RAM between them. The system also boasts an alarming 8GB of DDR2-800 RAM, which is also the same burnt orange as the case. Thankfully, a 64-bit OS allows all the memory to be addressed, but we still think it's a touch of overkill.

But how does all this tech gel together when it comes to actually delivering the goods? Only our

benchmarks know the answer. And, now, you.

Frankly, we were impressed. In 3DMark Vantage the Predator pulled down a score of p10,002 marks, which is pretty impressive for what is now, effectively, 'old' technology. It laughed at *Crysis* – though it glitched before the benchmark could complete, the average fps was sitting around 35-plus, while the max frames pumped out per second was above 45.

You're always going to get more bang for your buck if you build yourself, but by the same token, you're not going to get a system – with matching monitor! – that looks quite like this one. It is expensive, yes, but a lot of care has gone into the build and specs. If you've got the cash, it's an easy machine to recommend. **DH**

Performance Vrrooom!	92
Value The greater the spec, the greater the markup.	70
Build Well implemented water-cooling, good design.	89
Future-proofing Designed with overclocking and upgrading in mind.	81
Overall Stunning design meets good performance.	**83%**

Scorptec Venom Overclocked Edition

A well specced, well-priced gaming PC. But where have the corners been cut?

Price $2,679 **Supplier** Scorpion Technology
Website www.scorptec.com.au

Specifications Intel Core 2 Duo E8500 @ 3.6GHz (overclocked); Gigabyte X48 Chipset, 1600MHz FSB, Dual DDR2-1200, Dual PCI E x16, SATAII, RAID, GB LAN, 1394, 8Ch DTS; 4GB (2x 2GB) OCZ DDR2800 RAM; 512MB Radeon HD4870 512MB graphics card; 2x 500GB 7200RPM HDDs (in RAID 0); 20x DVD+/-R/RW; Plantronics Audio365 Stereo Gaming Headset; Razer DeathAdder gaming mouse; Logitech Corded Wave keyboard; Hades Gaming Styx mouse pad; Acer 22in LCD monitor; NZXT HUSH Black ATX Case; OCZ 850W GameXStream Power Supply; Xigmatek Red Scorpion CPU Cooler; Vista Home Premium.

There's a real sweet spot when it comes to speccing a machine for gaming or performance. You want the best possible gear, of course, but that adds cost. Finding that tipping point between price and performance is the challenge of every PC builder, and it's a challenge that Scorpion Technology has risen to with gusto.

The Venom OC may not be much to look at, though. In an unprepossessing NZXT Hush case, it's all old school alloy side panels and faux-brushed aluminium highlights. The blue LED slashing across the case's swing-door front may not be to all tastes, but it's a striking effect nonetheless. One thing that we did notice about the Hush, however, was that it lives up to its name. Even under load we couldn't really hear any of the fans whirring away to help the fun bits deliver nothing but the choicest of pixels.

Opening up the case, there's damping material on both side panels and the lower surface of the case – we guess that stuff really works! Looking beyond the dampening, the case is the very model of a modern cabling... um, something that rhymes with 'general'. But it's good, regardless, with everything cable tied away from airflow routes and kept away from major components. This machine would be a breeze to dig around, but for one little issue.
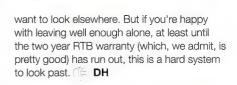
There's a sticker over the seal between side-panel and rear-panel, with the dreaded words 'Warranty void if removed'. Not what an inveterate tweaker and upgrader ever wants to hear! Scorptech do make good machines, there's no doubt, but as we've said before it pays to open up any new PC just to make sure that everything is in working order, that nothing has been bumped lose in transit (which often happens to CPU fans or less than properly secured cabling). Doing that with a Scorptech machine would void your warranty, so you're placing a lot of faith in the hands of others. You have been warned.

All that aside, the machine kicks some serious butt, especially given its price. Performance aside – we'll get to it – you're getting a lot of machine, with top end graphics card, all the peripherals you could want, and a reasonably solid overclock. How solid?

The 45nm E8500 in the Venom runs stock at 3.16GHz, and has been bumped up to 3.6GHz. We noticed no instabilities at all under load, and it really helped makes Vista feel a lot more spry. It also helped boost scores across all our benchmarks.

3DMark06 scores felt a little off the pace, at 14,350 at stock settings, but that's still up there with the mid-range systems tested in our Gaming PC Roundup in issue 91. 3DMark Vantage returned a respectable 7,745 marks, which is just about bang on for an overclocked Dual Core and single card setup. Our usual gaming test, Crysis, romped in, though, with over 28fps average at standard settings, and even managing a fair 15fps at 1600 x 1200 with 4x AA. And all in wonderful silence.

The Venom OC certainly has the power, but if you're at all interested in having a play with the innards of your machine – and really, we'd recommend that to any reader – you might want to look elsewhere. But if you're happy with leaving well enough alone, at least until the two year RTB warranty (which, we admit, is pretty good) has run out, this is a hard system to look past. **DH**

Performance Will eat most games for breakfast.	91
Value An excellent package for gamers.	88
Build Superlatively cabled, strong cooling.	82
Future proofing The warranty is good, though restrictive.	69

Overall Great for those who don't want to open their PCs.

81%

Screen test

Wrap your viewing gear around our selection of big and cheap 22in LCDs. **Alex Bradner** investigates.

LCDs have come a long way in the last 18 months, when anything bigger than a matchbox would set you back a grand and image quality was still a wildcard. But we've moved on from those dark times into a new and enlightened era of affordable, big panels that also perform really well.

The market always has a sweet spot, and right now it's on 22in panels, so we've taken the time to compare half a dozen panels from the big brands, all of which are less than $400 and have a resolution of 1,680 by 1,050.

Unsurprisingly, the supplied facts and figures for each of these monitors were misleading, so the only way we found to choose between any of the offerings was to see them in action.

Commonalities

All the monitors that we looked at had a few common traits, however. They were all very bright; even the darkest monitors put out more than enough light for a very bright room and should be dimmed significantly for normal use (we generally run ours at 20-50 per cent).

Response times were all identical, and we couldn't see any smearing. Interestingly, we found the 2ms monitors were no faster than the 5ms ones. Looking into it a bit further, we noticed that the 2ms monitors were only rated as such because of their grey-to-grey performance. The 'typical' response for all them was 5ms, and grey-to-grey response wasn't measured on panels that quoted 5ms responses, so from what we can tell, monitors that quote faster response times are just fudging figures.

Mark I Eyeball gave us a lot of insight into our victims... I mean, uh, test subjects, but in order to properly penetrate their shiny black façade, we brought in custom software and pulled a few tricks out of our sleeve.

In DisplayMate we were looking at the range and quality of colour reproduction, and we focused on a couple of tests in particular. The first was a colour and greyscale gradient ramp. Here we looked at three things: whether every shade is distinguishable from its neighbours; whether the overall gradient is smooth or has steps; and whether the gradient gets linearly brighter, without dropping off to black nor blooming out to white too soon.

Next up we had a look at how well it can produce extreme greys. Due to the way TN LCDs work, the darkest and brightest hues are difficult to display. As a result, some panels can flicker violently or simply won't display those

A note on dead pixels

Every manufacturer has their own policy on what constitutes a defective pixel and what they are prepared to do about it. ISO 13406-2 (http://en.wikipedia.org/wiki/ISO_13406-2) classifies these different policies for simplicity. Class I monitors with any pixel defects will be replaced with a shiny new one. Class II monitors can have a few defects before they are replaced and often have restrictions on the location of the defects before replacement.

All of the monitors we tested were either Class I or II.

Our second response test saw us writing our own software – a very simple program that rapidly flashes halves of the screen between black and white. By flashing at 62 Hz – just above the refresh rate – we created a page tear, giving us a hard edge to measure against. Next we whipped out a DSLR camera. With the exposure time set ridiculously low (1/400th of a second), we snapped the screens and examined the image where the colours swap for gradients and check for any smears that shouldn't be there.

Here we were interested in the little details – like card readers, multiple inputs and the general overall build quality of the monitor.

None of the budget LCDs we tested had height adjustment, so keep your old phone books. You'll probably want to stick at least half, if not the whole alphabet beneath your monitor to get it at a comfortable height.

How We Tested

Short of a pistol duel, we fired everything we could at these monitors. The industry standard DisplayMate combined with our very own

hues at all. This gives us an insight into the true performance of the firmware that drives the monitors.

Measuring response times was a little trickier, and we used two tests before we got a result. The first: a UT3 deathmatch. In theory, the rapidly changing gameplay would illustrate any major issues with the monitor. But they all looked good, and none of them smeared colours.

So another test was in order.

Our last test was a comparison of a standard image. We were familiar with how the image should look, and we used it to gauge the reproduction on the test monitors.

Finally, our overall impressions of each monitor weighed heavily on the overall score. Here we were interested in the little details – like card readers, multiple inputs and the general overall build quality of the monitor. Attention to those details was rewarded, but if corners were cut so was the score.

Monitor Specifications

	Acer P223WB	AOC 2216VW	Chimei CMV-222H	Dell E228WFP
Colour	Black	Black	Black	Black
Display Size	473 x 296mm	464.9 x 290.6mm	474 x 296mm	473.76 x 296.10mm
Dot Pitch	0.282mm	0.277mm	0.282mm	0.282mm
Resolution	1680 x 1050	1680 x 1050	1680 x 1050	1680 x 1050
Brightness	300 cd/m2	300 cd/m²	330 cd/m2	300cd/m2 Typical
Contrast Ratio	2500:1 (ACM)	3000:1(DCR)	1200:1 (na)	800:1 (na)
Viewing Angle	170° (H), 160° (V)	170° (H), 160° (V)	170° (H), 160° (V)	160° (H), 160° (V)
Response Time	5ms	5ms	5ms	5ms
Speaker	None	None	None	None
Weight and Dimensions	5.25kg	5kg	7.6kg	5kg
	513.8 x 390.6 x 258.4 mm	505.8 x 404.6 x 210mm	525.7 x 336.9 x 219.9mm	409.1 x 511.14 x 149.16mm
Standard Warranty	3 year pick up and return			
RRP (incl. GST) [Street price]	$529 [$350]	$399 [$250]	$410 [$355]	$349

Monitor Specifications

	LG W2252TQ	LG W2242T	Samsung 226BW	Samsung 2232BW
Colour	Black & silver	Black	Black & silver	Black
Display Size				
Dot Pitch	0.282mm	0.282(V) mm		
Resolution	1680 x 1050	1680 x 1050	1680 x 1050	1680 x 1050
Brightness	300cd/m2	300cd/m2	300cd/m²	300cd/m²
Contrast Ratio	10000:1	8000:1 (na)	3000:1 (DC)	3000:1 (DC)
Viewing Angle	170° (H), 170° (V)	170° (H), 170° (V)	160° (H), 160° (V)	170° (H), 170° (V)
Response Time	2ms (GTG)	5ms (without GTG)		2ms
Speaker	None	None	None	None
Weight and Dimensions	4.4kg	4.65kg	5.3kg	4.95kg
	519 x 429.1 x 220.9mm	574 x 407 x 127 mm	514.6 x 396.4 x 219.3mm	
Standard Warranty				
RRP (incl. GST) [Street price]	$388 ($330)	$346 ($280)	$799 ($330)	$489 ($399)

Acer P223W

Feature-rich, but is that enough for all our tests?

Price $325 **Supplier** Acer
Specifications 2500:1 in ACM mode (Standard est. 700:1-1000:1); Tilt;
DVI (w/ HDCP); VGA **Pixel policy** Class 2
Our settings Brightness 72, Contrast 31, ACM off

Out of the box the Acer had washy colours. The one-touch contrast control, 'Empowering Technology' is generally woeful, but does empower you to fix it manually and after a quick tweak you can get good colour. It also has a smooth colour gradient with no banding and almost all the levels in the greyscale test. The adaptive contrast management doesn't actually do a lot other than play with the brightness, which became a little irritating in dark movies. We left it off.

Our biggest complaint would be the glossy finish to the screen, which becomes very frustrating if there are any light sources behind you. Seeing your reflection in dark scenes probably wasn't in any directors' vision either.

On the upside, the P223w was one of the few monitors without backlight bleeding and blacks were blacker than on any other monitor. Add to this the vibrant colour of the glossy screen and games looked excellent, but this is the only redeeming feature of going glossy. If the native resolution is beyond your graphics card (if you're connecting it to, say, an Eee PC), downscaled modes are still quite good.

It's not the sharpest tool in the shed, but it looks great, runs well and, dressed in 'piano black' it would be a welcome addition to your mantelpiece. As for your desk, we're not quite convinced, though its price has dropped considerably in the last little, something close to $200, so if all you do is game, and you keep movies in the loungeroom, this might be a good solution.

Overall
Great for gamers with a bit of cash.

74%

AOC 2216VW

Cheap and accurate... but what holds this monitor back from greatness?

Price $239 **Supplier** AOC
Specifications Tilt; DVI (w/ HDCP); VGA **Pixel policy** Class 2
Our settings Factory

When we ripped the AOC out of its box we didn't think much of it – aesthetics certainly aren't its forte. The flimsy stand didn't win any points either, however when we plugged it in, our opinion radically shifted.

For the just about the cheapest monitor in the bunch, it was one of just two to have the colour pretty close to right – for our eyes at least – without fiddling. The gradient ramp looked fine with almost all of the individual levels visible. Each level of grey was both visible and distinct, and for once the greys were actually grey.

Unfortunately, any adjustment (except brightness) you might want to make is met with horrendous results and the menu requires an advanced understanding of cryptography, so it's best left alone. Since the defaults aren't bad, for the average internet user/gamer on a budget this is a strong candidate.

There's not much else to say on this one. There is some backlight leakage but this isn't noticeable most of the time and its other salient features are identical to every other monitor in the roundup, but it is very cheap if you do a bit of shopping.

Overall
A great budget choice, but there are better monitors for the price.

79%

Chimei CMV-222H

If it seems to good to be true, it usually is.

Price $335 **Supplier** Chimei
Specifications Tilt; HDMI; VGA; Component Video; Composite Video; S-Video; 2x5W Speakers; 6-in-1 Card reader
Pixel policy Class 2 – beware; policy ambiguous in favour of ChiMei

The Chimei was the only monitor in the bunch to feature video inputs. Which is good. However, in order to squeeze the price down, some major sacrifices have been made. There's no DVI input, for example: only a compatible (but annoying) HDMI input.

The out of the box experience is made even more awkward, as there is no way to connect to a computer digitally. There is no included digital cable. At all. There is a VGA cable though, which ghosted slightly, so you will want to buy a DVI to HDMI cable, which will add another 20-odd bucks to the asking price.

Additionally, the stand uses some kind of voodoo – it is completely assembled while flat packed, and uses a combination of death-defying hinges and a superfluous lock to hold it shut when packed. The lock and the second hinge are unused once fully extended, meaning that only the tilt is adjustable and provides no height or rotation options.

When we did get it plugged into a computer, we found that the colour reproduction wasn't fantastic, and there was some noticeable banding in the gradient test and indistinguishable grey levels. Unfortunately, this wasn't the end of our testing woes.

Every part of the OSD was clunky. There is no quick way to change volume and input selection is done via yet another OSD, which looks like it escaped from the 90s.

When it was displaying component video, the unit we were sent had an obvious purple tinge to everything. When we pursued this with Chimei, they weren't able to provide us with a replacement so this issue could affect the entire line. Composite and S-video were acceptable, although the upscaling from our Wii and SD tuner sources were both average.

Overall Perfectly adequate, which is really pretty... with faint praise.

62%

Dell E228WFP

Is this up to Dell's usual monitor standard?

Price $349 **Supplier** Dell
Specifications Tilt; DVI (w/ HDCP); VGA **Pixel policy** Class 2
Our settings Use the red preset – it's better than factory

The Dell entry into this roundup was nothing short of abysmal. There, we said it – and it hurt us, too, as normally Dell produces some of our favourite monitors. Sadly, it seems the company has given up on the budget LCD market and figures that its brand name will solve the issue of spending money on research and development.
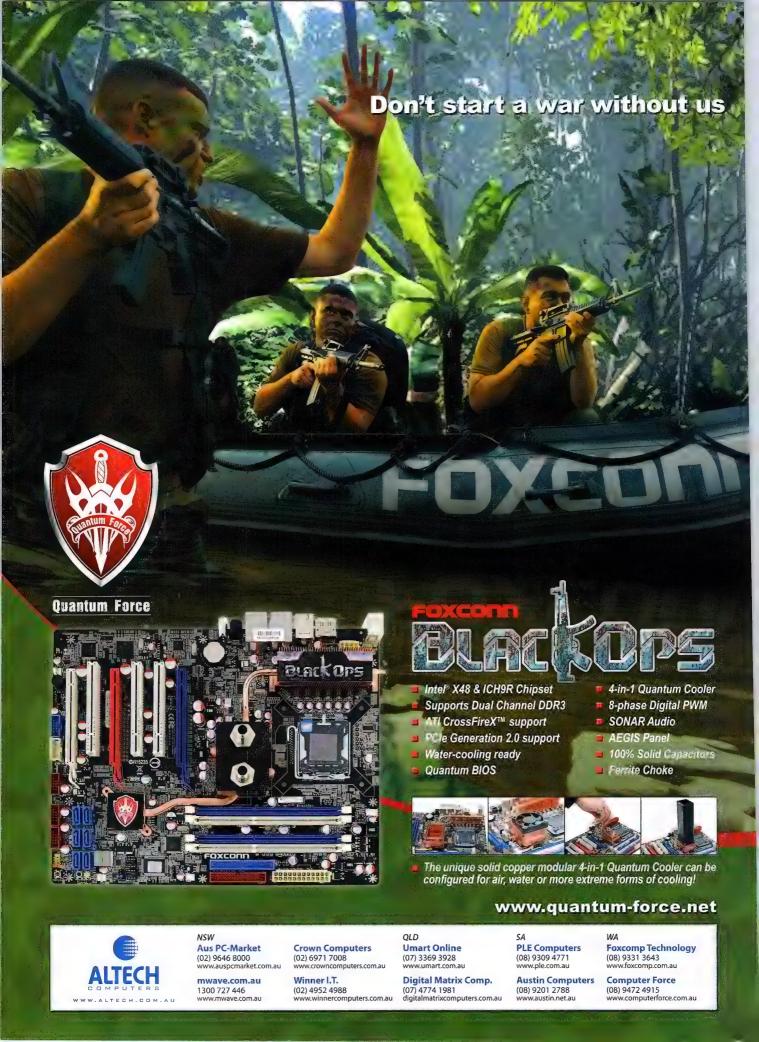
Out of the box, we immediately noticed that the image was overly red, but calibrating it exposed a 'feature' of the panel: It dithers over space rather than time. So not only is it useless for even amateur image work but it makes everything look scungy, given any modern operating system's reliance on smooth gradients.

Hidden in the menus was another gem: you can set the colour to YPbPr mode, the same standard that is used in component cables, even though it has no component inputs. The only conclusions we came to was either it was an artefact left over from another model with component input. That or Dell wants you to break out the solder.

Unfortunately, nothing stood out to redeem the E228WFP, and with the number of faults we found – combined with the fact that nearly every other monitor has drastically dropped in price over the last little while – we had no choice but to give it the wooden spoon.

Overall Pricey and lacking in the usual Dell quality. Not...

49%

LG W2252TQ

Life really is Good with LG...

Price $269 **Supplier** LG
Specifications Tilt; DVI (w/ HDCP); VGA; Pixel **Pixel policy** Class 1
Our settings Blue > 61-63, 'User' Colour mode

When we fired up the LG W2252TQ, an unusual jingle played from some hidden internal speaker. Apparently 22 inches of brightness aren't enough to say "I'm on now". Thankfully, you can kill this (and the power LED) via the menu if you'd like.

We did have to adjust the colour slightly out of the box, but with that out of the way we were genuinely pleased with how well the 2252 performed.

When we first fired it up it was a little red to start with, but after we bumped up the blue no one was any the wiser. The only other change we made was killing the Active Contrast Enhancement feature by switching the F-Engine mode to User. You might be able to get away with leaving it on, but manually darkening the screen yet again gives better results than letting hardware make decisions for you.

All of the DisplayMate tests were spot on, leaving all the others well behind. This trend continued in colour matching as well,

providing the best colour reproduction of the bunch. To top it off, multimedia and gaming was great too, so full marks all round in this part of our testing.

The menu system is a little unwieldy, but it does give you a lot of control over your image and the adjustments aren't half bad once you work it all out. There's also an option to squish the display into 4:3 mode (effectively 1400 x 1050) so older games don't look distorted, however the otherwise excellent downscaling seemed to have thrown caution to the wind here so you probably won't want to use it.

Overall it's an excellent candidate, and on paper the LG's are rated 20 per cent more energy efficient than the rest of the roundup. For the price you just can't top it.

Overall
Simply the best combination of quality and price you'll find.

96%

LG W2242T

Cheap isn't always bad.

Price $239 **Supplier** LG
Specifications Tilt; DVI (w/ HDCP); VGA; Pixel **Pixel policy** Class 1
Our settings Blue > 62-64

For a good while we thought about simply cutting and pasting the review of LG's other monitor into this round up, and simply striking through the very few differences...

We mean it, even though they're different on paper, there is no discernable difference between these two screens except how they look. This is great if you're strapped for cash

(or just don't care about aesthetics) because it means that for a few dollars less, you can have the same exceptional quality as the 2252, but without all the extra bling. Do you really need that bling? We didn't think so.

Its power light is quite bright, but like its bigger brother can be turned off. This is about the only really negative thing we could think to add.

Overall
The absolute choice for the enthusiast on a budget.

93%

Samsung 226BW

An aging warhorse that still has a few tricks...

Price $350 Supplier Samsung
Specifications Swivel; Tilt; DVI (w/ HDCP); VGA
Pixel policy Class 1 Our settings Factory

The 226BW is the oldest kid on the block, released nearly two years ago, and it has long been the rebellious teenager of the Samsung line up. Cheap, imported models caused the local units to gather dust, and eventually Samsung replaced the 226BW with the improved 226CW, but that's only available at Harvey Norman and costs a lot more. Pft!

But enough history. With the price tag on the 226BW crashing down and plenty of units still around, there are decent deals to be had if you're willing to shop around.

Out of all the monitors we tested, the

226BW is structurally the sturdiest of the lot. Samsung's attention to detail certainly shows – the finish is excellent and it sports a good, solid stand that swivels as well as tilts. But when it comes to performance, the older tech driving it starts to show its age.

Its gradient test was smooth and colour reproduction was good (if a touch blue-tinged), but there was slight flickering in the darkest of greys and the very brightest were indistinguishable from the background. It is worth pointing out that you aren't going to notice any of these issues unless you moonlight as a Photoshopper, though, especially with the constant motion in games and movies.

It has a couple of good image presets for general use, but you should definitely stay well

away from the dynamic contrast option. We found that if you leave it on its 'internet' preset, it is generally well suited to just about everything.

The points it lost in image quality are certainly earned back in build quality. A very good monitor, but in terms of raw performance it's not the best.

Overall
A solid monitor that is becoming more valuable as the price drops.

87%

Samsung 2232BW

Trimmed down from its fancier brethren, but still a solid player.

Price $299 Supplier Samsung
Specifications Tilt; DVI (w/ HDCP); VGA Pixel policy Class 1
Our settings Factory

The build quality on the 2232BW isn't as good as the other Samsung we have in this roundup (which we swear to you was described as having "an air of arrogance and professionalism" to it –ed). It's obvious that when the money shears came out, it was the chassis that got a pruning. The swivel stand is gone, replaced with a strange knee bone joint that just feels flimsy. The whole unit is about a kilogram lighter, which really isn't a good thing. It feels a bit disposable, not to mention likely to rock about it during busy gaming sessions.

That said, our complaints stop right there. All of the performance issues we had with the 226BW have been cleaned up nicely, even the overbright power LED that niggled

us has an adjustment. The result is that the 2232BW's throwing punches with the LGs.

Colour was spot on out of the box, and DisplayMate tests were all excellent. The extreme greys were all discernable and the jitter in the dark greys we saw in the 226BW are now gone as well – ticks in all the boxes here. Like the LGs, the 2232BW seems to command the cream of current TN driving technology.

Overall, the 2232BW is a very strong contender. The build quality issues we had are easy to ignore, and while this was once a very expensive proposition for what you were getting, it has dropped markedly in recent months. It was once tough to recommend , but now, this is an excellent deal if you know

Overall
A top grade monitor edged out only by price.

91%

LG W1952TQ and W1942T

In the course of this round up we also had a quick look at couple of other monitors that LG flung our way. These are the little brothers of the two LG LCDs we tested, and apart from their size, are identical to their bigger brothers (which, in turn, are internally identical). Having used 22in monitors for this roundup, dropping back to 19in definitely felt cramped. For an extra $40, we would recommend the extra real estate that the 22in models give you.

One thing we did notice with these two is that they didn't have the redness of their bigger brothers out of the box – but that problem is really moot as you can correct it with a few button presses.

The big picture

There's a really good chance that by the time you read this, any number of these monitors will be even cheaper. As always with technology, this may in turn lead you to think that you should wait for larger monitors to drop in price, but we've said it before, and we'll say it again – waiting helps no one.

Instead, if you're yet to upgrade to a large LCD, or even if you're still using an CRT, there's no better time to upgrade than now. According to the Valve hardware survey, there's a lot of people out there still using 17in monitors – what's up with these people?!

No, with the best of the monitors in this round up being also amongst the cheapest, the evidence for upgrading is pretty strong. With modern graphics cards capable of pushing ever more pixels, especially the latest 1GB models, having a lot of screen real estate is going to translate into a better computing experience across the board, whether you are gaming or watching movies and TV shows.

Plus, the low price of our award winners in this test mean that multi-monitor set-ups are more approachable than ever. Everyone in the Atomic HQ uses a couple of monitors – at least – and it really makes a big difference, at least when it comes to productivity.

And watching a film while you type (I'm not doing it, honest –ed), is a great way to fly.

Go to battle with one of three different factions in the new Red Alert 3. Win glory for the Soviet Empire, defend the homeland with the Allied Forces, or combine technology and mysticism with the Empire of the Rising Sun. Play online with a friend or choose from a group of AI commanders and fight to see who controls the land, sea, and air. Join the fight today!

M Violence

KITLOG

There's nothing sexier than new kit. And whether you need to horde your pennies (Budget), want the most power for your dollar (Performance) or own a small mansion and a collection of sports cars (Extreme), we're here to help with this handy matrix of Atomic recommended products. You may find your needs fall between categories – that's okay, just mix and match to suit your budget! Each piece of kit has been reviewed hands-on in Atomic, so if you want to learn more, look up the issue and page number listed.

ATI is dominating the KitLog at the moment. NVIDIA continues to put out new cards, and more are on the horizon, but you simply can't beat the price /performance advantage of Big Red.

BUDGET

CPU

AMD Phenom X4 9550
PRICE $170-180

A well performing Quad core for those on a budget, that won't break the bank and doesn't get too hot.

MOTHERBOARD

BIOSTAR TA790GX A2+
PRICE $150

A great overclocker with fast integrated graphics - you don't even need to buy a graphics card with this one!
Reviewed in Issue 93 – Page 34

MEMORY

TEAM Xtreem Dark PC2-6400 C4
PRICE $60

These modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits.
Reviewed in Issue 80 – Page 56

VIDEO CARD

GeForce 9800GT 512mb
PRICE $150-160

A 55nm card that remains very cool and fast, with plenty of headroom for overclocking and a price that speaks volumes about it's value. Great performance too.
Reviewed in Issue 92 – Page 49

COOLER

Noctua NH-U9B
PRICE $72

Labs tested to be the top of the cooling game without breaking the bank (or making you sweat – haha)
Reviewed in Issue 89 – Page 36

SYSTEM DRIVE

640GB HDD
PRICE $90

The absolute best value for money, with two 320GB platters giving great speed and low latency.

DISPLAY

AOC 2216Vw
PRICE $240

A great 22" widescreen for any purpose, with accurate colour reproduction and a bloody good price.
Reviewed in Issue 94 – Page ??

SPEAKERS

Steelsound 5Hv2
PRICE $120

Great gaming headphones with inbuilt mic, but music quality falls short.
Reviewed in Issue 73 – Page 43

CASE

Cooler Master CM690
PRICE $100

A sturdy, spacious case with plenty of airflow and more than enough room for the biggest of systems. Some stores even have a windowed version!
Reviewed in Issue 84 – Page 51

PERFORMANCE

Intel Core 2 Duo E8400
PRICE $190

A processing powerhouse, now affordable and overclockable like buggery. The Q6600 is the best buy, at about $240.

GIGABYTE EP45-DS4P
PRICE $195

A P45-based mobo with a bevy of features and a good overclocking potential.
Reviewed in Issue 93 – Page 55

TEAM Xtreem Dark PC2-6400 C4
PRICE $60

Cheap, overclockable and good lookin' to boot. The modules fill the void that was previously left between cheap value RAM and enthusiast overclocking kits.
Reviewed in Issue 80 – Page 56

Sapphire HD4870
PRICE $319

One of the best price to performance cards on the market. Welcome back Red!
Reviewed in Issue 92 – Page 36

Thermalright Ultra 120 Extreme
PRICE $65

Tower cooling that will keep your tower cool. Whack a Nexus 120mm fan on for near silent cooling.
Reviewed in Issue 89 – Page 33

640GB HDD - Times two!
PRICE $90x2

All the speed of dense platters, with the peace of mind to be able to back up your precious files.

LG W2252TQ
PRICE $270

You'll pay a little more for this 22" screen, but the colours are amazing, with no backlight bleed and no ghosting.
Reviewed in Issue 94

AVLabs AVL325
PRICE $210

Slightly aged speakers now, but these still offer a great 5.1 sound experience - if you can find a set.
Reviewed in Issue 64 – Page 50

Cooler Master HAF 932
PRICE $180

A massive case with three 230mm fans that can move enough air to qualify as a small aeroplane. And quiet to boot.
Reviewed in Issue 93 – Page 48

EXTREME

Intel Core 2 Extreme Q9550
PRICE $410

A 45nm Quad that can be pushed almost as far as the dualcore counterparts, while staying cool and fast. Great for multitaskers.

GIGABYTE EP45T-Extreme
PRICE $359

A board that not only dabbles in excess, but redefines the word. More copper than silicon here as well.
Reviewed in Issue 93 – Page 57

Patriot Viper DDR3-1800 C8
PRICE $325

Very cheap DDR3 with amazing performance, and a great OC'ing capability too. You can't go wrong with these modules.
Reviewed in Issue 93 – Page 52

ATI 4870X2 2GB
PRICE $650

All the performance of two cards, with the size of one. Makes an ungodly amount of heat, but matches this with unbelievable performance.
Reviewed in issue 93 - page 32

Coolermaster Aquagate Max
PRICE $239

The best of all boxed watercooling solutions, this kit is a great step up over air cooling. We like how green it is.
Reviewed in Issue 90 – Page 36

WD 3000GLFS VelociRaptor
PRICE $349x2

The fastest desktop HDD we've seen yet. Grab two and RAID 'em, or mix 'n match with a 640GB for storage capacity and speed.
Reviewed in Issue 90 – Page 52

Dell 3008 WFP
PRICE $2199

It's enough to make a grown man weep and beg. Or, at least, that's what we'd do for one of these simply gorgeous displays.
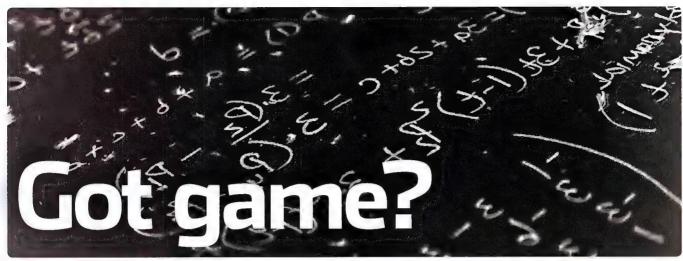*Reviewed in Issue 88 – Page 59*

Logitech Z-5500D
PRICE $319

Able to play the 'liquid gold' that is DTS 96KHz/24-bit, this 5.1 beast can wreck both home and hearing alike.
Reviewed in Issue 48 – Page 56

Lian Li X-2000
PRICE $575

The only case we've had in that has made the editor orgasmically happy, and is drenched with quality in every one of it's brushed aluminium panels. Definitely a case to show off your system-building prowess!
Reviewed in Issue 91 – Page 54

Got game?

Daniel Rutter looks at some useful mathematics we can all use. Or is that abuse...

'Game theory' is a branch of applied mathematics. But despite that, it's as fun as it sounds. And it's useful, too. Grasp some basic game-theory concepts, and you've got a short-cut to improved comprehension of all sorts of tricky everyday situations.

Suppose, for instance, that you are a game reviewer.

The nice people at SuperExcellentSoft have sent you their newest game, Orphanage Burner IV, which obviously promised to be a lot of fun but is, in your opinion, actually awful.

But SuperExcellentSoft have bought a great big ad in your magazine for many thousands of dollars, and will surely buy more, not to mention invite you to 'release parties' at 'corporate entertainment venues' where there will be 'hookers' and 'blow'.

If, that is, you say nice things about their software.

Let us further suppose that you live in the frictionless Land of Game Theory, where the concept of professional ethics is as nonexistent as… well, as professional ethics usually actually *are,* among used car salesmen, lawyers and journalists.

You now have a choice to make. That choice is one of the many permutations of the 'Prisoner's Dilemma', one of the bedrock concepts of game theory.

In the pure version of the Prisoner's Dilemma, two guys being separately interrogated by the police each have the option of clamming up, or of snitching on the other guy. If they both keep quiet, they'll each get three months in jail. If they both snitch, they'll get five years each. But if one snitches and the other doesn't, the police will let the snitch go free and put the silent patsy away for ten years.

This sort of logical structure – where you can cooperate or betray, and where there's a big reward for you if you betray and the other guy cooperates – is repeated over and over again, in all sorts of real-world situations. It seldom maps perfectly to the pure Game Theory Land version, but the basic concepts hold.

If you buy a new laptop on eBay from some dude in Hong Kong, for instance, he has the option of betraying you, by sending you a box with a brick in it in return for your money. You, in turn, have the option of taking delivery of a real laptop and then just *saying* that you got a brick in a box, and reversing the payment.

Or let's say you're playing a two-versus-two match in your favourite RTS. If you stick by your ally through thick and thin, you will get, at beast, a shared victory. But if you wait until your enemies are definitely going to lose and then stab your ally in the back, the glory (and online leaderboard points) will be yours alone!

The biggest way in which real-world situations usually differ from the basic game-theory prisoner's dilemma is repetition. In the real world, people do repeat business.

If you skip out on the bill from a restaurant, you're unlikely to be welcome there again. If you send your eBay customer a brick in a box, his feedback will affect your business. And persistent loot ninjas have a (slightly) harder time getting into MMORPG groups.

These situations all reflect the best strategy for sequential Prisoner's Dilemmas: Cooperate *until* you're betrayed, then betray.

(But don't make the mistake of betraying someone just because the last couple of times you dealt with someone else, you were betrayed. If people start betraying automatically, as they actually do in some games and unregulated markets, it spreads like a disease until the market's completely useless. Everyone's writing cheques that bounce to pay for bricks in laptop boxes.

Philosophically, this is a neat example of creating 'morality' from first principles, rather than waiting for some prophet to tell you what to do.

But it's also a very handy mental tool. Especially when you notice your ally's parking an awful lot of artillery behind your base.

Need more mathematically precise life advice?
dan@atomicmpc.com.au

... if you wait until your enemies are definitely going to lose, and then stab your ally in teh back, the glory will be yours alone!
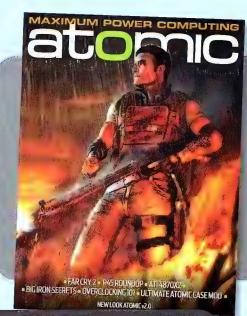
CHOOSE YOUR MYTHBUSTERS DVD!

At Atomic we enjoy watching Mythbusters. We especially like the fact that it makes geeks like us feel superior to anyone who actually believes that mobile phones interfere with the instruments on a plane. If you become a subscriber to Atomic, or renew this month you can join us in this feeling of superiority by choosing your Mythbusters DVD!

Choose from:
Mythbusters James Bond Special (DVD or Blu-Ray)
Mythbusters Cars Special (DVD only)

MAXIMUM POWER COMPUTING
atomic

• FAR CRY 2 • P45 ROUNDUP • ATI 4870X2 •
• BIG IRON SECRETS • OVERCLOCKING 101 • ULTIMATE ATOMIC CASE MOD •
NEW LOOK ATOMIC v2.0

EXCLUSIVE COVER!

WHY SUBSCRIBE?

1 SAVE SOME HARD EARNED DOLLARS

2 CHOOSE YOUR MYTHBUSTERS DVD!

3 DELIVERED TO YOUR DOOR, OR MAILBOX, OR A SECRET HIDEAWAY

4 FULL MONEY BACK GUARANTEE

5 THE GREATEST TECH MAG IN THE GALAXY, DELIVERED!

SUBSCRIPTION PRICES

Australia
1 YEAR (12 issues) – $69.95 **SAVE 35%** off the newsstand price

2 YEAR (24 issues) – $120.00 **SAVE 44%** off the newsstand price

NZ
1 YEAR (12 issues) – NZ$75.00 **SAVE 34%** off the newsstand price

2 YEAR (24 issues) – NZ$137.00 **SAVE 40%** off the newsstand price

Offer available until 11/11/08. *Only available to new or renewing subscribers to Atomic during the promotional period. Page Code: CI/A94

m.au/subscribe or call **(02) 8227 6499**

TUTORIAL

TUTORIAL

HANDS-ON TUTORIALS FOR THE TECHNICALLY MINDED

It's a short but sweet outing with our DIY section, but we're sure you'll like it nonetheless.

Ron Prouse is back on deck this month, and he'd still blowing on about case fans. He's got a number of ideas to add a bit of character to your case while at the same time keeping your gear nice and cool. Gotta love practical solutions that look good too. And shiny – we loves the shiny.

Then Chris Taylor continues his exploration of educational institutes with a guide to two smaller, more specialised schools that focus on the arts interactive. Gaming, and 3D design, in other words.

We then finish up with some more pondering of the Geek state of mind from Zara Baxter, who this month shares with is the grim dark reality of a nerd-run future. Be afraid!

74

81

78

DIFFICULTY
INTERMEDIATE

Fitting Fans Tutorial Pt02

Ron is back, with a brand new intention.

We mentioned back in Issue 92 that there were several more fan-fitting applications that that we wanted to chronicle, including a method of replacing small-ish existing fans with larger ones. In the first instance, a simple fan port, we are using a serious bit of apparatus – a dedicated hole-saw, which can be used for metal, plastic and aluminium applications. Although they are not cheap to buy initially, there is no argument that they deliver perfectly round, consistently-sized holes every time. Well, that is, as long as they are used correctly.

This type of saw consists of two parts; a centre section called the 'mandrill' which incorporates a

Never try to stop one of these with your bare hands. Ever!

pilot drill, and the removable outer blade section which is the actual hole-saw and which come in a myriad of sizes. When working with thin material (like every metal case panel ever made!), the usual problem is that the pilot-drill hole will become elliptical, allowing the saw to rotate 'out of round' and cut an irregular shape – typically with nasty scratches around the perimeter.

The easiest way to overcome this is to mark the position of the fan on the panel, drill the four fan-mounting holes, and then draw diagonal lines to find the centre position of the proposed fan hole. Next, secure the panel to a block of scrap timber using wood screws through the fan mounting holes. Drilling through the panel and into the timber keeps the pilot drill firmly located centrally until enough of a groove has been cut by hole-saw to hold it in position.

A similar method is used to neatly replace an existing fan with a larger one – for example, swapping out an old-skool 80 or 92mm with a more contemporary 120mm unit. First step again is to mark the position of the replacement fan on the

Adding a fan into an acrylic window is relatively simple.

Disclaimer

Whenever you pick up power tools, cutting and grinding instruments, or even a can of spray paint, you are putting your general wellbeing at risk from some form of industrial level accident. We take every precaution by wearing appropriate safety equipment, using tools with respect and within their limits, and by not inhaling the contents of glue and paint containers. We suggest that you should follow a similar regime, and seek professional assistance and guidance if you are attempting a task outside of your skill set.

NB. Atomic and staff are not responsible for your safety or longevity.

Tools

The tools used in this tutorial are mainly those found in the average workshop, including a drill press and drills, electric sander, router and hole saws. The main requirement is a decent bench or table, providing a solid, flat surface to operate on.

Don't just stick to the traditional, get individualistic on its ass!

panel, making sure that the 'new' hole will eclipse all of the original fan holes. Drill the four new mounting holes, and secure the panel to a block of scrap timber as before. Draw diagonal lines to find the centre position of the intended hole, and cut it out as outlined above.

In thicker materials, such as this 6mm-thick acrylic sheet, there is less need to help locate the pilot drill, but care has to be taken not to shatter the sheet at the exit point of the drill-hole. To cut out the actual fan-hole we have found that the best method is to let the teeth slowly 'shave' the plastic away until reaching the 'half way through' point, and then to flip the sheet over and finish it off from the other side. This method delivers a near-perfect result, without the fear of chipping or cracking around the hole perimeter as the saw breaks through. The inner, cut edge can then polished to a glas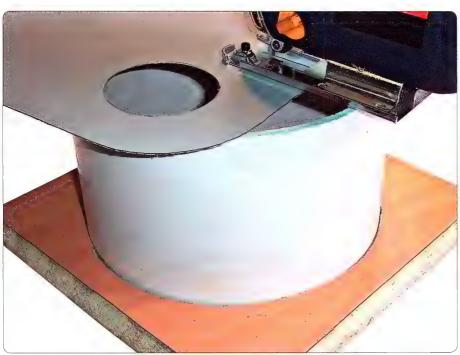s finish with #1200 grit wet'n'dry sandpaper, lubricated with Brasso metal cleaner. The fan mounting holes have been countersunk for two reasons; the smooth, recessed finish looks great, but countersinking also spreads the load from the tapered screws evenly over a larger area, and is less likely to promote cracking.

This is probably the most useful tool we have when it comes to case modding – no, not the jigsaw, we mean the 'support bench'. Seriously, If you are cutting, shaping, grinding or sanding sheet metal or acrylic, the important part is to support the work-piece as close to the action as possible. This is a short section of 30cm PVC pipe, recessed into a 40X40X4cm piece of timber, and has become one of the best 'all round' tools in our workshop... especially when cutting fan-holes with a jigsaw!

OK, the jigsaw is actually pretty handy too, especially if you are cutting shapes other than circles. The main thing to ensure with a jigsaw is that you are using the right blade for the material being cut, and that you make haste slowly. We always use the finest pitch (number of teeth per cm) blade, and run the jigsaw at about half speed – sure, it takes a little longer to complete the cut, but it is time that you would have spent cleaning up the 'speed wobbles' with a file and sandpaper anyway.

Square peg, round...

While we're on that subject, should a fan-hole always be round? There is no reason at all. One of the points that we wanted to make in this tutorial is that one of the factors to consider when fabricating custom ventilation fittings

It's amazing what you can make out of PVC sewer pipe and a lump of wood.

Steel mesh and computer cases have a natural affinity for each other.

Another variation on the 'fixed side fan' theme is to create the illusion of a blow-hole by using a flared speaker box port...

is that you can break away from the traditional shapes and styles. This blow-hole was designed to house a 1x 120mm radiator into the inner top-skin of a CoolerMaster ATC-210 case, and was cut into an octagonal shape just to be a little different from all of the rest. The hole in the outer skin was cut to the same shape, but slightly smaller in dimension so as to conceal the inner edges, with the end result being a clean, stealthed look. The finishing touch was a section of AC Ryan Meshx™ sandwiched between the two case layers.

Another option to using a separate fan grill is to copy the OEM look, and drill a series of holes in a grid pattern; this may be a little restrictive from an airflow perspective, but does add flexibility to the aesthetics of your case-mod – especially if you are trying to match-up to existing case ventilation solutions.

One situation that has always caused us great angst has been fitting fans into removable side covers; it's not the physical location of the fan, but the messy wiring and need to have a quick-release electrical fitting that causes us pain. One effective work-around is to have the fan attached to the main chassis, close enough to an open port to be able to suck air in from the outside. The fan pictured in the side window uses a Zalman fan bracket and 92mm fan with rubber anti-vibration screws securing the dust

filter, while simultaneously stopping vibration against the Perspex panel.

Internal cooling is really about circulating cool air to the hotter areas, and then expelling the resultant warm air out to atmosphere as quickly as possible. Creating internal turbulence to displace 'dead space air' becomes even more important with H2O systems, which traditionally have less case airflow than their air-cooled equivalents. Therefore, another alternative is to fabricate a fan mount that can also be attached to the inner chassis, positioned to draw fresh air in through a mesh panel cut into the case. The advantage to this method is that the fan can be positioned so that it is supplying air directly to a specific area or component, such as the RAM or graphics cards. Once the outer cover has been cut in the desired location, the mesh is glued into the inside of the case panel with two-pack epoxy, allowing a 25mm overlap around the outer edge to ensure a strong bond. To get a really 'pro-look' finish, make sure that the rows of holes in the mesh either line-up perfectly with the sides of the opening, or run diagonally across … anything in-between will look half-assed.

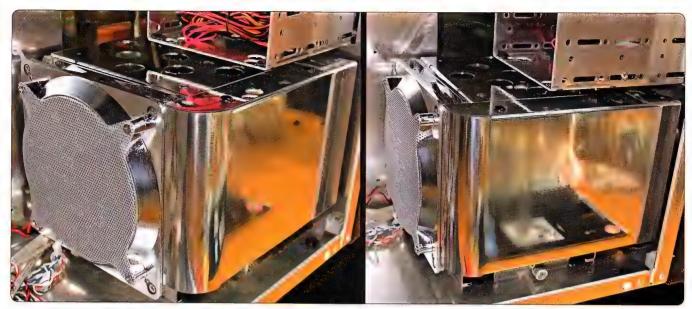## The art of illusion

Another variation on the 'fixed side fan' theme is to create the illusion of a blow-hole by using a flared speaker box port (Jaycar cat # CX2688). In this instance, an 80mm intake hole was cut into the cover in perfect alignment with the fixed fan, and then the speaker port tube was chopped and sanded right down to almost flat. Fine mesh was attached to the outer side of the fan, held in place with the fan screws, and then the speaker port attached to the case panel with two-pack epoxy glue. There should be a slight gap left between the inner edge of the speaker port and the mesh so that there is no vibration created between the two.

What about air-cooling peripheral components, such as hard drives? Sure, there are 'off the shelf'

Even diminutive cases can have additional ventilation added in.

Two 25 x 55 x 3mm aluminium brackets were fabricated and riveted to the inside of the upper section of the rack, then the brackets and the duct were drilled to accept two black Lian Li locating plugs – those expanding things that Lian Li use to attach fan grills – to give it a consistent OEM look.

Another aluminium bracket, with a 3mm screw as a dowel fitting, was attached to the bottom of the rack to locate and secure the lower section of
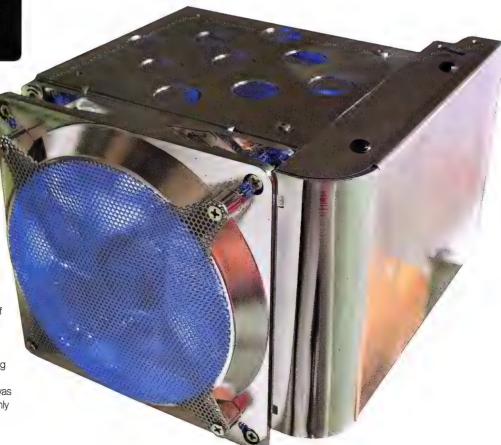
the duct. Finally, the duct was also polished to a high-gloss shine.

Our previously warm HDD's are now encased inside of a shiny, bona fide wind tunnel, which also has the added advantage of creating a much higher air-flow rate across the lower section of the case. And although it looks a bit like an art deco toaster, it even has cool blue lighting.

Win all 'round.

units available, but we were looking for something a little more individual for an ongoing Lian Li PC-A07 case project. In this instance, the OEM rack sits in the usual position at the front of the case, directly behind a 120mm front intake fan, and some of that air-flow then makes its way across the floor of the case toward the rear exhaust.

As we were using lots of shiny bolt-on bits, the first step was to take the aluminium HDD rack and polish the visible side and top to a mirror finish with AutoSol metal polish. A chrome CoolerMaster 140mm fan was then fitted, using the rubber washers from a packet of anti-vibration screws between the contact surfaces at the mounting points, as they will eliminate most of the fan-generated noise. A silver 140-120mm fan converter was then attached, with a silver MeshX fan guard screwed to the 'exhaust'. Although this mod was based on good cooling principals, we also wanted to hide the HDD's from view, so a Lian Li 120mm air flow duct was grafted onto the side of the drive rack – but only after the gimpy, grey plastic sleeve had been removed.
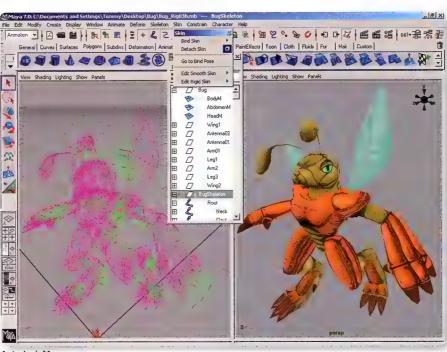
Specialised Institues

This month we have two options for those seeking a different path to educational enlightenment.

Australia is home to two institutes that specialise in delivering games development courses – the Academy of Interactive Entertainment and Qantm College (AIE). You'll find a campus of at least one, if not both, of these institutes in all of the eastern mainland state capitals. Both AIE and Qantm work closely with the industry and graduates from both institutes enjoy ample opportunities to make contacts in the industry, gain real world experience through large-scale group assignments and, eventually, find employment either locally or abroad. Furthermore, both institutes – which both started with a single campus each-- are expanding both geographically and in terms of courses offered. Both institutes are undeniably world class and choosing between them is really a matter of one's location, economic situation and career goals. For overseas readers, both institutes accept international students. In terms of accommodation, Qantm apparently has contacts that can get students into home stays, share houses, serviced apartments and hotels if necessary, while AIE leaves students to figure that sort of thing up to the individual, although their website does provide estimates of week-to-week living expenses for both Canberra and Melbourne.

Autodesk Maya.

Academy of Interactive Entertainment

The Academy of Interactive Entertainment has been operating for a number of years now. Originally based in Canberra, it eventually opened a campus in Melbourne. A Sydney campus will
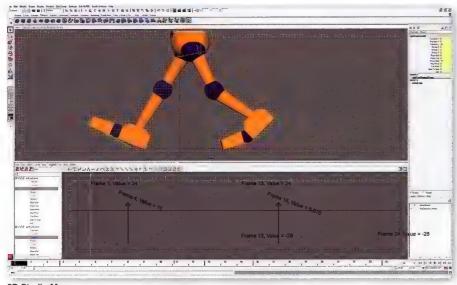
open this month in Ultimo. The original campus still offers the widest variety of courses, but given time Melbourne and Sydney are bound to catch up.

Every couple of months, AIE comes up with a new range of short courses, covering everything from making zombie films to multi-threaded

coding to MEL scripting in Maya. Some of the courses are quite obviously just for fun, while others will help you expand your knowledge on a particular software package or give you the opportunity to walk away with a Certificate-level qualification. Prices for the current batch of short courses range from $220 to $900. For those with children, there's a selection of short courses on offer during the school holidays aimed at geeky kids, covering basic 3D modelling, animation and the development of simple 2D games. These courses are priced at a flat rate of $220. The short courses are only available at Canberra at this stage, but as of next year the Sydney campus will start running similar holiday programmes to the Canberra mothership.

For a small, privately-run institute, AIE has a respectable range of Certificate-level courses. The Certificate II in Screen (Basic 3D Animation) is the most basic, running over 18 four hour sessions. As the title suggests, it provides an introduction to the fundamentals of modelling and animating. Year 11 and 12 students in NSW and ACT not only get a significant discount ($193.76 as opposed to $571.76), but can have this course count towards their HSC. As of March next year, AIE's new Sydney campus will offer the Certificate II in Screen as well as the Certificate II in Information Technology (Basic Game Programming), which is already on offer in Canberra.

3D Studio Max.

The Certificate III in Screen (Visual FX for Film) is on offer only at the Canberra campus at this stage. It covers working on post-production for cinema with the Discreet Combustion suite and 3DS Max. As with the Certificate II in Screen, the Certificate III in Screen (Visual FX for Film) is delivered through 18 four hour sessions. Note that AIE wants students to have some prior experience with 3DS Max and digital video cameras.

Offered at Melbourne, the Certificate III in Screen (3D Animation) covers modelling, texturing, animation and the fundamentals of lighting and atmospheric effects. There are no pre-requisites for entry. Requiring significantly less commitment than the Diploma-level courses AIE offers, the Certificate III in Screen (3D Animation) can provide a taste of what it would be like to study full-time in this field. While you would still need to show off an impressive portfolio and sit an interview, the Certificate III in Screen (3D Animation) can act as something of a pathway into the Diploma courses.

Both the Canberra and Melbourne campuses offer the Certificate IV in Screen, but with their own twist. Students at the Canberra campus work in 3DS Max, modelling and animating characters and environments. Melbourne students, on the other hand, use Autodesk Maya.

The Certificate IV in Information Technology (Programming) acts as a pathway into the Advanced Diploma of Professional Game Development and covers coding in C++. While one need not be a programming expert to gain entry into this course, some sort of experience with at least one coding language is a must. Note that the language need not be C++.

The Advanced Diploma of Game Development, offered at all three campuses, offers two streams – the Art major and the Software Development major. Students of both streams work together on various projects, simulating a real games studio in which artists and coders must work side-by-side in order to get results. The Software Development major, which follows on from the Certificate IV in Information Technology (Programming), allows students to focus their studies on particular topics, including AI,

3D Studio Max.

C++.

networking, graphics and effects. This course is good. AIE proudly boasts that 95 per cent of their programming graduates find employment in the industry within three months of graduating. The Art major covers a wide variety of topics including character animation, texturing, level design and game design.

The Advanced Diploma of Screen (3DS Max) and Advanced Diploma of Screen (3D Animation and Visual FX) are offered at all three cam uses and the Sydney and Canberra campuses respectively. The Advanced Diploma of Screen (3DS Max) is targeted at those who want to get into film and television and covers high-detail modelling and advanced animation techniques. The Advanced Diploma of Screen (3D Animation and Visual FX) uses Autodesk Maya and assumes no prior knowledge of the software, but does require applicants to have industry experience, a Certificate IV in 3D Animation or a Certificate IV in Screen.

One thing to keep in mind about all of these courses is that they are not covered by the HECS/HELP initiative. Various banks offer student loans if paying upfront is an unrealistic proposition for you. More information on that can be found here: **http://www.aie.act.edu.au/info/student_loans.php**.

Qantm College

In recent years, Qantm College has expanded from having one campus in Brisbane to having campuses in Sydney and Melbourne. All campuses are very accessible by foot and public transport from the CBD of the city in which they're situated. All campuses regularly run days during which year 10, 11 and 12 students can get a taste of life at Qantm – an opportunity that our younger readers would surely find worthwhile.

Unlike AIE, Qantm doesn't offer Certificate-level courses. At the bottom end of their offerings are the Diploma of Screen and Media (Animation), Diploma of Interactive Digital Media and Diploma of Screen and Media (Digital Video Production). The latter is obviously aimed at those seeking

employment in film and television. The Diploma of Screen and Media (Animation) can act as a pathway into the institute's flagship course, the Bachelor of Interactive Entertainment, and covers all the fundamentals of modelling and animating in industry-level software. The Diploma of Interactive Digital Media is essentially a multimedia course, covering a wide variety of topics including web design, game design and animation.

The Bachelor of Interactive Entertainment, as noted earlier, is the institute's flagship offering. It offers three majors – Animation, Games Design and Games Programming. The two-year long Bachelor of Interactive Entertainment (Animation) covers both 2D and 3D animation, starting with the fundamentals and working up to more advanced stuff. The Games Design major, on the other hand, covers various topics including the

psychology of gameplay, scriptwriting, character development and level design. Finally, the Games Programming major covers C++. Whatever major students choose, though, they will dabble briefly in the fundamentals of all three fields. Furthermore, all students have to do a number of business-oriented subjects, including project management and copyright law.

Studying industry-relevant laws and project management is also a part of Qantm's other Bachelor degree-level offering, the Bachelor of Applied Multimedia. This is more a multimedia course than a games development course, covering the design and development of interactive content for a variety of platforms, sound editing, video editing, graphic design, interface design and animation.

Qantm degree-level offerings are covered by the FEE-HELP system, although the National Bank offers $10,000 p/a student loans. To find out more about these loans, contact the bank on 132265. Qantm encourages prospective students to get their applications for loans in early, as the banks take time to process and approve applications. **CT**

Autodesk Combustion.

Geek eye for the average guy

The history of geek-led ideas is littered with one-size fits all solutions that don't and aren't.

It used to be, back in the day, that everyone thought we'd be wearing stylish one-piece jumpsuits by the year 2010. The only way I can see that happening is if the geeks take over. And let's face it, none of us really want that.

Hear me out.

Look at what happened when geeks proposed the kind of food we might eat in the future. They come up with food pills. Food pills. Talk about mixing business with pleasure.

Now, admittedly, the idea of a food pill came out of a long history of trying to find ambrosia: the perfect food which would both sustain and

Designing the perfect solution can become a horribly bad idea when humans are involved.

Arthur C Clarke wrote a book of futurism in the '50s that, among other wrongheadedness, envisaged us all living in underwater cities by the middle of this century.

Sounds great, in theory. It ticks all the boxes, such as providing space where space has become an increasingly dwindling commodity and having ready access to food sources and water sources needed for human sustenance.

But let's face it, if you were asked to choose between living in a comfortably sized dwelling in

The trade-off is well worth the price of my threadless teeshirts.

Given the history of geek-led ideas, all the talk about how much better the world would be if geeks ran it makes me want to chew furniture and become a Batman villain. A geek government would be incredibly utilitarian: the very best solutions for the greatest number, with the best possible intentions. Linux for all. Food pills for breakfast, lunch and dinner. Black as the only colour for clothing. Science fiction shown on TV at reasonable hours and to predictable schedules. Wait, that actually sounds good.

No. It would sound amazingly awesome on paper, and it would be the worst possible place to live. And I say that as a fully paid-up geek.

A world run by geeks? I'm not buying it. I'm not even renting it. I like being able to make frequent bad choices. Although I could do without some of the consequences… **ZB**

Zara Baxter reads enough celebrity gossip to know that jumpsuits are back in. Be very afraid.
zbaxter@pcauthority.com.au

It may sound cool, but I have an aversion to sudden and unexpected asphyxiation.

nourish, while being easy to farm and produce. Scientists of the late 19th century, seeing the amount of poverty and starvation among the poor and working classes, set out to try and create something that would be available, easily prepared, and fulfil the requirements of the masses.

As part of this process of looking at the most complete and nourishing foods, they came up with such genius ideas as peanut butter, for which we should be eternally grateful. They also came up with soy-protein… no comment. If the name Sanitarium pops into your head at this moment, it's for a good reason.

Ideally, this perfect food, as originally imagined, would also prevent the masses from indulging in lewd and deviant behaviour – such as sex. You can see why it never took off.

Actually, that's not the reason it never took off. It was because someone spotted that eating isn't just about fuel. It's also about human group bonding and hedonism. Where would we be without the concept of mouthfeel? Without the exquisite blend of stimulant and sugar that makes cola taste so good? Without degustation menus? Without Heston Blumenthal and his molecular cookery? Without dinner parties?

an underwater city and a small apartment in a crowded city, which way would you go? I'd pick packed slum every time, because I have a fear of both crushing death and drowning. And that's before factoring in my strong need for vitamin D.

Similarly, until I get planetwide terraforming, I'm sticking with Earth, rather than trying my hand at colonising space. The geeks can have it. Seriously, it's all yours. It may sound cool, but I have an aversion to unexpected asphyxiation.

And I probably shouldn't mention it, but there's that perennial geek favourite barrow to push: Linux. Linux is the "use it because it's good for you" one-size-fits-all solution to operating systems. I think I even have RMS saying that on a Dictaphone tape, somewhere.

I use Linux, before you start writing those excoriating emails, and I freely admit to not really making the best use of it. I like it, even. I'm sure it has tremendous advantages over my current choice of Mac OS X, just like peanut butter is nutritionally advantageous compared to smoked salmon. But that's like saying that a Star Trek uniform for everyone (woohoo! –ed) would be beneficial because of the reduction in fashion disasters and body-image angst.

Drivers wanted

Technology drives the world, and people drive technology. Opportunities worldwide are abundant, exciting, rewarding and diverse. QUT is recognised as a superior educator of IT professionals and whether you are new to IT, or looking at upgrading your skills set, QUT has the right IT degree for you. **Find out how you can become a driving force for the future at www.fit.qut.edu.au/courses**
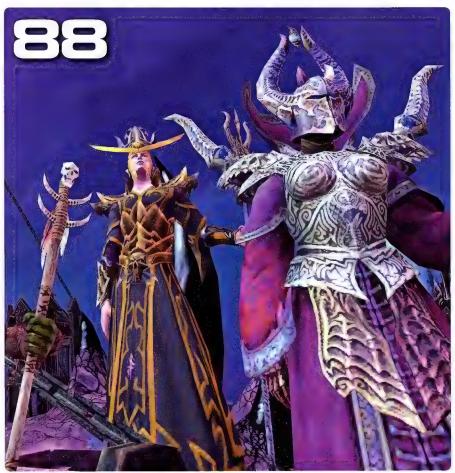
QUT

a university for the **real** world®

GAMEPLAY

GAMES, GAMING AND FILM COVERED... ATOMIC-STYLE

The hot gaming season is starting up, so we're starting to run out of room to cover all the BIG releases. Mind you, as problems go, this is a peachy one to have – you simply cannot have too many great games.

First off the rank this month is our Engine Room feature, with new ER guy James Matson at the gaming helm. He's hot off the phone after a chat with the president of local dev outfit Fuzzyeyes. Edge of Twilight is their brand new game, and we've got all the details on this great new Australian property.

Then it's review country, with our first taste of new MMO epic Warhammer Online: Age of Reckoning. Should WoW be WoRried? We think so... If the grind ain't your style, though, we've got the click-fest Space Siege, the latest Civilization title (farm, peons, FARM!) as well as Saint's Row 2 and Spore.

Then, as always, we close things out with a taste of anime culture, with the Japanese robot epic Vexille.

88

HARDCORE CONTENTS

90

94

84

Living on the Edge

In lieu of having a brass Dirigible to fly, **James Matson** checks out the up and coming Steampunk game Edge of Twilight by Aussie developers Fuzzyeyes.

The genre of Steampunk is so artistically rich, so given to imaginative excess that it's surprising more games aren't founded in an environment of steam power and brass-plated technology. Alas, those of us with a penchant for Steampunk's elaborate mix of fantasy and science fiction have been left to go hungry between 16-bit greats like *The Chaos Engine* by The Bitmap Brothers and more recent efforts like Microsoft's *Rise of Nations: Rise of Legends*.

Australian developer Fuzzyeyes however, spotted the chance to land on the gaming scene with an adventure/RPG slated for release on the Playstation 3, Xbox 360 and PC that gives fans of Steampunk something to drool over. We sat down with Mr. Lu, Wei-Yao, the CEO of Brisbane-based Fuzzyeyes studio to get some background on *Edge of Twilight*.

atomic *Edge of Twilight* has been pegged as a 'fantasy steampunk' environment – can you explain that to us in a little more detail?
Lu, Wei-Yao The use of the steampunk theme has had such a tremendous response from everyone; it gives us more confidence to

continue creating more content for it. Clearly we're moving in the right direction and are presenting the steampunk aspect of the environment well. Initially while developing the game, we researched for an art direction that could fit and complement the dark and foreboding storyline presented in *Edge of Twilight*. We wanted the world of Hellayem to be an environment where players experienced and drove deep into the atmosphere.

Steampunk is an art direction that is severely underused, but has such a huge potential. The theme appealed to us because it is largely open to interpretation and has given us a lot of opportunity to define the rules of societies within such a world. The steampunk world of Hellayem did not constrain us like a sci-fi or high fantasy world would have.

atomic *Edge of Twilight* is apparently the first IP developed in Australia for the PlayStation 3. Were there unique challenges developing for the PS3 as opposed to say, the PC?
Lu, Wei-Yao This is a very interesting question. We haven't received confirmation on whether *EoT* is the first IP in Australia

for PlayStation 3 but we know for sure it is definitely one of the very few in Australia. We found that the biggest challenges we faced in developing for the PS3 were all attributed to creating and maintaining original IP rather than platform or technology challenges. As we are not a company dedicated to creating new technologies, we use middleware like Unreal

If public transport looked this cool we'd all be riding it.

be manipulated.

atomic The background of the game talks about a mysterious energy source that has pitted the worlds two factions against each other, what's the score here?

Lu, Wei-Yao Ether is the name of this energy in Hellayem and the main reason for all the trouble that is occurring within it. Ether has different forms depending on the environment and time cycle it is in. During the Day cycle it takes on a more solidified organic form, which still contains the essence of Ether at its core. However, during the Night cycle it becomes a much more fluid floating form which looks a little like condensed air or mist. Ether usually appears around natural Ether points, places in the environments from where Ether is released. It is pretty similar to the world situation we live in today – oil being a main source of energy for many, and how it has become scarce.

In the game, two civilizations compete to harvest the energy to their own benefit. We have the Lithern, a mystical and extremely spiritual race that used to live and thrive during

Engine 3 to minimise the risk for cross-platform development. Therefore, this makes the process of developing on different platforms quite smooth. Of course, there are significant costs involved for porting to different platforms but the risk for developing is minimal.

Comparatively, developing and maintaining original IP is like being handed the reigns of a wild horse. This is where the core value of Fuzzyeyes lies; our strength is our ability to create and maintain new IP. Things are definitely easier if the IP reigns were handed over to someone else but due to our ability to keep the IP, we have the freedom to create any games on any platform based on the IP. The possibilities are endless, not just games but merchandise, films... why not throw in a theme park! So you know where I'm going with this, having an original IP is priceless. However, keeping the theme park and action figures aside, we will be focusing on bringing *EoT* to all platforms.

atomic Give us the low-down on where *Edge of Twilight* is set

Lu, Wei-Yao *Edge of Twilight's* story begins in the unique and mysterious land of Hellayem. Hellayem is a vast and largely uncharted land that contains all manner and varieties of fauna and flora. Unlike regular Day and Night cycles, Hellayem used to experience a unique long-lasting cycle of approximately six months for each state. Because of this, the environment had become equally unique and diversified with lush forests that thrived during the Day cycle and more rugged and dead landscapes that formed during the Night cycle. The mood and feel of each location and its inhabitants changes depending on the realm. An example would be that certain enemies appear in one or the other realm exclusively. Similarly,

The mood and feel of each location and its inhabitants changes depending on the realm.

environments alter slightly depending on the realm, with the effect of hindering or facilitating progression for the player. The easiest example of this is the operation of machinery within the world. In the day realm machines are still functional and can be operated, however in the night realm machines are dead and cannot

the Night cycle of the world. They are a very long-lived species that is part-flesh, part-spirit. The Athern race are a more human-like species that was known to be extremely self-centered, self-sufficient, materialistic, and wasteful; an obvious analogy to how the majority of humanity could be characterised today,

living and prospering through their unique technological inventions and their uncanny ability to exploit everything within the given world.

atomic The player is cast as 'Lex' – what's his place within the game Universe?
Lu, Wei-Yao Lex is the main character, around which most of the story will revolve. Lex is a half-breed, Athern and Lithern. Growing up in such a harsh and sometimes lawless environment quickly led him to rely on both his Athern and Lithern roots, becoming extremely proficient in his sword fighting skills as well as his thievery abilities, made possible by his hidden Lithern talents. He is labelled as an outcast and a loner; a man who is tough, self-reliant, and dangerously skilful with the blade. In the day realm he is a lot slower, bulkier, more powerful and his combat reflect this. During the game, players will be able to use and manipulate Ether to their advantage. Being the only half-breed, he will soon come to realise his deep connection to this energy. Day Lex will be able to use Ether energy to operate Athern-based Ether powered technology or machines. Conversely in the night realm he is quick and ninja-like, so it feels different but it is equally satisfying. Night Lex has a much more spiritual and natural connection to Ether. Everything around him revolves around Ether passing through his body, and will determine his Vitality. He will also be able to use Ether for a number of specific abilities that he acquires in the game.

atomic The game is obviously designed as an RPG title, so what classic RPG elements can we expect to find, and what does *Edge of Twilight* bring to RPG genre that's new?
Lu, Wei-Yao *Edge of Twilight* is not an RPG, rather it is an action adventure game with several light RPG elements. What we are trying to do with *Edge of Twilight* is to expand the linear nature of classic action adventure games by giving players freedom, but still retaining the

Stephen Hawking, steampunk style.

Em aciduip eugiamet vel dolesto consendipit voloborperil endre magniatum alit la adiam volessi tatuera estrud minit, quis dolorpero

cinematic story progression. In *Edge of Twilight*, we leave it to the player to discover, or uncover, the storylines and secrets in the world of Hellayem. From the outset players will have the opportunity to access a large Citadel and from here they will choose to venture on numerous side quests, buy, sell and upgrade items, interact with NPC, or complete the main storyline. We encourage players to explore the world of Hellayem and investigate the side stories and mysteries of the world, players will be rewarded with a higher story payoff throughout the game.

atomic Is the game more weighted towards puzzle-solving and interaction, or action and fighting?
Lu, Wei-Yao What we've been trying to do from day one was create a good and balanced game. By design *Edge of Twilight* focuses on action adventure elements. This is by no means a pure action game; instead what the game is achieving is a fusion of heavy cinematic action sequence with intelligent puzzle-solving together with a degree of exploration. What we encourage players to do is to venture around the huge steampunk Citadel interacting with different characters, to finding themselves deep inside dangerous enemy territory fighting off hordes of enemies.

86

atomic Nothing has been mentioned as far as multiplayer or an online component to *Edge of Twilight*. Is it planned or will this be a single player experience?

Lu, Wei-Yao Beginning from day one *Edge of Twilight* has been planned as a single player experience. Many great games centralise their games and gameplay on a single player experience. Therefore, we feel that multiplayer would not have suited the goals which we set out to achieve from the start. It would definitely take focus away from the single player portion.

atomic Although there's obviously a lot of effort going into making *Edge of Twilight* unique, if you could draw a parallel between an existing PC/XBOX 360/PS3 title, what would it be?

Lu, Wei-Yao We really try not to use or reference ourselves parallel to any particular game in the market today. We have had so much experience time after time when we invited certain exclusive magazines for a preview of *Edge of Twilight*. We are surprised that almost everything from character to gameplay reminded them of a specific game in the market. What we are trying to do is simply trying our best in developing a great game for a particular genre and audience. Of course we are aware of similar experiences in the market and we definitely have taken inspiration by many of them, as so most games.

Edge of Twilight is a brand new IP for Fuzzyeyes; a dark steampunk fantasy set in a world where night and day have been torn apart. The goal of *Edge of Twilight* has been to create a world where players would get drawn into and try to uncover its numerous secrets. We are also hoping that *Edge of Twilight* will bring a fresh perspective on a well-known and cemented type of gameplay. This game has been a labour of love for us for the last couple of years now and we could not be more excited to bring it to light.

So there you have it, a daring tale of day and night, opposing civilisations fighting over scarce energy and in amongst it all one hellishly tough half-breed ready to tear the world of Hellayem a new, erm, dirigible.

Powered by the sexy Unreal 3 engine and rumoured to also tackle some interestingly real world issues like greed, genocide and oppression *Edge of Twilight* is shaping up for a 2009 release date, bringing with it the promise of Steampunk visuals, a detailed storyline and the potential for a smashing Australian IP.

Warhammer Online:
Age of Reckoning

Take up arms in the fight between Order and Destruction!

The Warhammer world is a place with a history longer than some actual real-world nations. The game started back in 1983 as a tabletop, miniatures-based wargame, and has since gone through seven hardback editions, been translated into two editions of roleplaying games, and made numerous forays into computer and console gaming. Now, at last, this grim and gothic fantasy vision gets the MMO treatment.

WAR, as the game is also called, is the latest effort from Dark Age of Camelot veterans Mythic Entertainment. As such, WAR has a very strong PvP focus, with realm vs realm combat tied into almost every facet of the game.

It's a good thing, too, since the strong background of the game is made of endless conflicts between the inhabitants of the Old World. The Dwarves hate the Orcs, humanity is fighting an endless battle against the forces of Chaos, while the Elves are at loggerheads with their corrupt brethren, the Dark Elves. To this end, the six races of the game are all ranged against their enemies from the very start of the questing cycle.

Before you get to that, however, there's character creation. WAR subscribes to the less is more school of character design, offering just the one body type per race, and selectable faces, hairstyles and tattoos and such, not unlike World of Warcraft. It's no Age of Conan,

with its slider-iffic character options, but there's enough variety amongst the predesigned options to please nearly every player. In an interesting move, Mythic's done away with general classes that each race has access to, and provided instead specific versions of the up to four classic character types (tank, support, dps and ranged). So, while High Elves who want to tank can choose a Swordmaster and an elegant double-handed sword-style of fighting, Chaos players can be a Warrior, a hulking, shield bearing agent of destruction. It's early days, but so far the classes seem quite balanced.

From there it's into the fray, and one of the things that the game excels at is making you feel not only part of the action from the get go,

but actually like you're an important part of it. There are no missions to collect X wolf parts, or do favours for this random NPC or that. Instead, nearly every mission relates directly to the war effort – convincing NPCs to join up, scouting terrain, killing the enemy or finding lost troops are all the order of the day for the early PvE quests. What's more, you look the part too. A lot of MMOs start you off looking pretty decrepit, but the starting gear in WAR – especially the High Elves' – is really quite epic looking. We were actually sad to lose some of that gear, even though its stats were woeful.
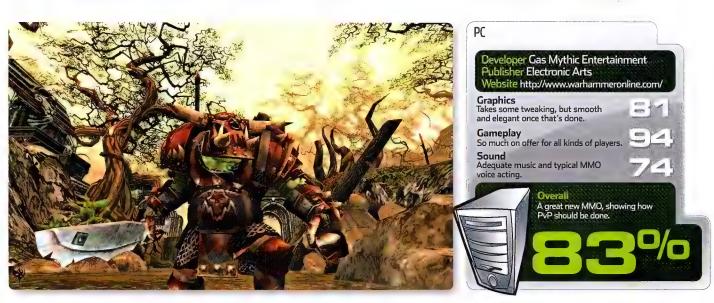
There are also two more types of quests available to players, and these are for more frocused on the war effort. There are Public Quests, open chapter-ordered quests that anyone in a region can contribute to and profit from, like killing 100 of the enemy, which then opens the next chapter, which may be killing five tougher mobs, which in turn unlocks a super-tough boss that you'll need 15 or more people to take down. The great thing about these quests is that you don't need to be in a group – if you see PQ being undertaken, you can just wade

into the action and contribute. At the Quest's end, everyone gets rated on their contribution, and rewarded thusly, with loot, XP, and renown (which opens up more rewards from NPCs and renown vendors – some good gear, too!).

The PQ system is probably the biggest innovation of Mythic's, lending a sense of the epic to the game which ensures that there's always BNIG stuff happening in the world, and rewarding players for it. There are also Realm vs Realm scenarios, specific quests that pit you against opposing players, as well as open RvR areas where you can capture strategic points. In another innovative move, these RvR quests and areas are open to all, regardless of level. There's nothing stopping a level two or three neophyte from getting stuck in from the get-go. What's more, each area is split into one of four tiers, and low level members of each tier get a zone-based buff to keep them competitive. For instance, we took a level six Swordmaster into an RvR zone and got buffed up to level 8 for our troubles. You don't get higher level abilities, but it still means you're not getting one-shotted every time the action starts.

Graphically the game seems to be a mixed bag. The max settings of the game are at least quite forgiving, but it still looks jaggy and plain, thanks to a lack of in-game anti-aliasing option. You'll need to force AA from your graphics card's control panel – once you do that, though, the game looks pretty sweet. The art direction is like a more refined version of the cartoony style of WoW, while still remaining true to the gritty artistic style of the 25 years' worth of illustrations from the tabletop game.

As of writing, we've hardly spent any time at all with WAR, but despite some horrendous launch issues (whole batches of faulty DVDs were released on the Australian and New Zealand markets, the game frequently crashes back to the character selection screen, random freezes and the rest of the worst things that can happen at launch) but we're still enamoured of this game. When it does work, it's a groundbreaking game that any PvP fan will love, with a rich amount of lore to draw upon, and excellent art design. Only the launch issues stop this being a perfect experience, but we're confident this game will grow into something truly great. **DH**

PC

Developer Gas Mythic Entertainment
Publisher Electronic Arts
Website http://www.warhammeronline.com/

Graphics
Takes some tweaking, but smooth and elegant once that's done. **81**

Gameplay
So much on offer for all kinds of players. **94**

Sound
Adequate music and typical MMO voice acting. **74**

Overall
A great new MMO, showing how PvP should be done.

83%

Space Siege

Oh no! Aliens! Click click click. Exploding barrels! Click click. Loot! Click.

Space Siege – creative, huh? – casts players in the role of Seth Walker, bad-arse soldier and one of the last surviving members of the human race. Humanity has gone out into the stars, it seems, and not been all that good at making friends. The Alien Kerak has laid waste to the colonies, and, at the game's start, has turned its attention to Earth. You and the 20,000 other survivors of the cataclysm are aboard the Armstrong, a vast space ship which serves as the game's main setting.

You might be wondering at the links between the fantasy roots of the previous games this one. It's kind of tenuous, as the control scheme is completely different, party mechanics are basic and limited at best, and looting stuff is treated in a rather abstract manner. In fact, we can't help but think that the naming convention is little better than an attempt to cash in on previous popularity, rather then letting Space Siege stand on its merit.

Which, of course, raises the question… Does it have any?

It's actually not an easy question to answer, truth be told, as despite a lot of flaws or poorly executed ideas, we nonetheless found ourselves quite drawn to the plot and the compelling clickfest that the game, at its heart, truly is.

Like the classic Diablo and of course the Dungeon Siege games, movement is simple – click where you want to go, and off wanders Seth to get there. Want to shoot a baddie? Click on the hapless mook and BOOM! they go. Confusingly, though, the camera is slaved to

what in many games are the default move keys – WASD – so there's some cognitive dissonance at play until you get used to it. More difficult are complex moves like dodging and moving about in combat. Seth, despite being a tough veteran, seems to have difficulty moving and shooting at the same time. Annoying. At least you eventually pick up a robot buddy to help you in exterminating aliens.

You can also employ a range of special close combat attacks, which are more devastating, but open you up to more risk. A host of exploding items left strewn around the Armstrong's corridors add some complexity to the game, but most of the combat skill comes down to choosing the right enemy to shoot first.

Combat is the heart of the game, and that's what character progression and upgrading is all about. Space Siege features a skill system very reminiscent of modern MMOs, where you can buy levels in certain talents and skills as you progress, opening up more and more as you level up. If you've played WoW or even Diablo II it'll be very familiar. The only issue is that, while in a long-term game like WoW, incremental increases in ability of two percent mean something. In Space Siege, it just seems a little… meh.

It all looks good, at least, and we doubt it'll tax most modern systems at all. Well-implemented physics means the battlefield can become quite hazardous as creates blow up and gas tanks cook off and zoom about the place, but, again, it all seems just bit of a gimmick.

And yet… we were entertained. The story

is pretty cookie cutter, but regardless there's a nice mystery to uncover, some interesting characters to pick up along the way, and, well, damn us if we still don't get a kick out of clicking on stuff for hours on end.

There's nothing ground-breaking about Space Siege, and ultimately is the gaming equivalent of popcorn. But we all still like popcorn, right? You're not missing out on the next big thing if you don't play Space Siege, but it's mindless gaming fun at its most repetitively addictive. **DH**

PC

Developer **Gas Powered Games**
Publisher **Sega**
Website **www.spacesiege.com/spacesiege/**

Graphics
It certainly is shiny, and the particle effects are very nice.
79

Gameplay
A bit repetitive, but still shallow fun.
65

Sound
Nothing particularly groundbreaking, but still perfectly serviceable.
70

Overall
A worthwhile timewaster.
71%

Civilization IV: Colonization

A classic gets another expansion, but is the veneer beginning to dull on this great series?

The latest iteration of *Civilization* follows on from the hugely successful and critically acclaimed *Civ IV*, with which it shares a name, but this is no mere expansion. This standalone title features an updated version of the Gamebryo engine that powered the original, and a host of new mechanics to bring to game-playing life the period of European colonisation of the Americas.

The basic mechanic is an intriguing one. You pick one of four colonial powers, and then pick a leader that suits the kind of gameplay you're looking for. It's a choice of eight in total, and whether you want to for an economic victory or a military one, you should be able to find something that suits. But, unlike in other *Civ* titles, you are not the top of the foodchain – rather, you're a mere colonial power, and you still have to deal with your European parent.

Essentially, you're a middleman, and game's core balance is built around the need to build a thriving a colony, deal with natives and other powers, and keep the King happy back home. It's actually quite an interesting challenge, and this is helped by the fact that the random natives you find around the map are more than just updated versions of Barbarians from other *Civ* games. Instead, there are village leaders, and entire native empires, that you can trade with, form treaties... in fact they are more like

smaller 'nations'.

So, like our historical forebears, you'll be faced with the choice to play nice or, essentially, seed native villages with TB infected bedsheets.

On the other hand, as we've said, there's your King, and he'll spend his time raising taxes, calling for money to build up the home fleet and so on. Again, you can play nice, or have a [insert commodity here] Party, just like the American Colonies did before the War of Independence. And when you do eventually declare independence you'll need to fight off an angry European army hell-bent on reclaiming its land. And do it, successfully, before any of your neighbours.

The lower-end gameplay is all pretty much identical, though there are some tweaks. You can swap your population into and out of set roles within each settlement, or the military. This means you can have all hands working at producing food, but then beat those ploughshares into swords when you need to see off an uppity native or delegation from King Inbred the XIII. Trade is also a more important part of the game, with local prices and those in Europe (which you'll return to lot to find colonists) fluctuating as the game progresses.

It holds together pretty well, bringing a fresh take on the old gameplay, but it's not a perfect re-thinking. For one, the whole trade and goods

management angle is a little obtuse, and seems to get in the way of the meatier parts of the game. Plus, more than any previous *Civ* game, there are long stretches of turn after turn of just hitting Enter to go to the next turn because there is nothing to do – hardly a great gameplay improvement!

Finally, there's the question of old wounds. Without getting too preachy, is it a wise move to reduce the colonial age and all its atrocities to such a light and brightly coloured experience? We'll leave that to others to answer, but it's certainly a question that has occurred to more than one observer.

Civ fans will likely find something to like here, we admit, but to our mind Colonisation lacks that certain... addictiveness that typifies a truly great *Civ* game. **DH**

Graphics
The upgraded engine adds a lot of pretty. **91**

Gameplay
Strong, but not as cohesive as past efforts. **73**

Sound
Lots of incidental effects and good music. **81**

Overall
Unmistakably Civ, but just not as good.

79%

Saints Row 2

Take back the streets in this contender for the sandbox gaming throne.

It's pretty hard not to play *Saints Row*, and its sequel *Saints Row 2* (how did they come up with that name... wow!), and think of the 'other' great sandbox title. In fact, it's so hard not to, that I'm not even going to try. The pedigree linking *SR2* to the *Grand Theft Auto* games is obvious. Which is not to say that *SR2* is eclipsed by *GTA4's* shadow, but the game may well have some... sibling rivalry issues.

Up front, however, the games are merely superficially alike – both are sandbox city simulators, but as soon as you start up *SR2*, the hamfisted gangsta rap tells you you're in for a different take on the genre. Character creation – which *GTA* doesn't even bother with – is another departure, and a remarkably fun one at that. You get the chance to choose pretty much every facet of your un-named protagonist's persona, from facial features, build, hair style and colour, to walk and voice. Like MMO *City of Villains*, a lot of people are going to spend more time with the character creator than the actual game, it's that much fun.

I mean, can you ever truly get tired of creating effeminate overweight Hispanic pimps?

After that process, though, you're locked tightly back into the game's plot, which takes things up five years after the last game's hectic climax. You've been in jail, in a coma, all that

time, and the banter of two guards who are surprised to hear you've woken up fills in some of the intervening background. A fellow inmate – who, incidentally, shanked himself so he could get into the infirmary and close to you – fills in the rest of the blanks as you and he break out of the Alcatraz-like prison.

Essentially, it's a simple story. Your gang is pretty much no more, the city has changed (man!), and the evil Ultor Corporation has everyone under its thumb. From there the plot spins out into a classic hero's journey of killing gangbangers and glassing innocent civilians while surfing car hoods to impress your buddies.

The game never really takes itself seriously, and is quite willing to poke fun at the problems of continuity (an old friend you rescue from court, for instance, gleefully points out "Hey, you look different.") alongside making fun of just about everything else – from cops to fast food to, well, just about everything, *SR2* has a joke at its expense.

While the game does have a strong plot, there are many side missions and mini games to engage in on your climb back up the gang ladder. To progress the main plot, you must earn cash and reputation to unlock each stage, by either taking on odd jobs around town, or engaging in out and out gang warfare. All the while you can open up new cribs, customise the ones you own, and shape the general look of your gang. Want a psychopathic clown squad following you around? Easy.

The racing and combative parts of the game are similarly loose. Where *GTA4* tightened up those gameplay elements (though not too much), *SR2* seems to revel in how over the top they are. The driving is loose and fast, though it does feature a cruise control function that
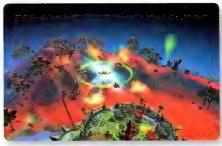
makes drive bays much easier (and for more elegant and enjoyable), and there are a number of animations for shooting badguys (and, to be honest, goodguys) in different spots. Who can deny the joy of crotch-shotting a row of prison guards, and watching all of them grab their nether regions in unison, like some blood-soaked Michael Jackson review.

There is a lot of game under *SR2's* hood, and many ways to play it, but ultimately your enjoyment of it is going to be limited by the game's rather... broad sense of humour. *GTA4* is more about story and character (and blowing up cars with rocket launchers), while *SR2* edges more college humour and fart jokes. Is that a bad thing? That's up to you. **DH**

Xbox 360

Developer Volition, Inc.
Publisher THQ
Website www.saintsrow.com/

Graphics
Gritty streets and blood spray never looked so good.
81

Gameplay
Very arcade, but with lots of fun variations.
83

Sound
GTA4 definitely has the edge in music and voice acting.
70

Overall
A different game every time you play it, with something for nearly all tastes.

79%

Spore

The game that aims high, but hits disappointingly low.

We, as gamers, have been indulged for most of our gaming tastes over the history of gaming. Almost any task, recreation, event and method of play has already been offered to us, giving us an almost overwhelming amount of choice. And then *Spore* came along.

Presented as an all-encompassing simulation of the growth and evolution of a species from a single-celled organism to an all-powerful space-faring civilisation, *Spore* certainly seems to be everything we could want. After all, who wouldn't want to play God on that kind of scale?

The thing is though – playing God just isn't that fun. Sure, you start out as a single-celled amorphous blob with a mouth, flagella and an eyeball, swimming around in the giant two-dimensional life-supporting oceans of a uniquely generated planet. Sure, you might smile as your creatures squeak and bubble at each other to communicate. But this first stage of the game is only as deep as it's two-dimensional setting, and this mainly serves as a tutorial stage to get you used to the controls, as well as giving the game a reason for forcing legs on you and dumping you on land (there is no option to stay in the ocean, which would have increased the depth of this game immeasurably).

Life on PC

As you grow legs and crawl out of the primordial pea soup that was your home, onto a continent that is already populated by a few of your cousins, you form a rudimentary collection of creatures, and venture off into the world. You have three distinct playing styles here: befriend, decimate, or a mix of the two. Unfortunately, if you try to befriend

other species on the island, you'll have to be prepared to click on one of only four options repetitively (or until your brain turns to mush). Similarly, if you attack every new species you meet, you'll have to do the same – but with RED buttons instead! Most of the fun in this portion of the game is found in the customisation of your creature, which is actually a decently fleshed-out 3D modelling simulation. This is all well and good, but to unlock any parts (or currency to buy these parts) you'll have to do a LOT of clicking. We'd prefer to see this stage fleshed out with some mini-games, or anything else, really, to make it varied and fresh for replays.

The next logical step, once you've sufficiently evolved your creature, is to form a small group of your creatures into a tribe. The game suddenly shifts from a third-person RPG, to an overhead RTS style, giving you direct control over multiple creatures at once. Any further alteration to the creatures is locked, leaving you with only some options to change their clothing. Here the task is much the same – befriend other tribes, or eliminate them from history. This is done by (yup, you guessed it) a lot of clicking, but is also hindered by the micro-management of having to keep your tribe's food levels up. The stage as a whole feels quite tacked on, and could definitely serve with some freeform base-building, as well as multiple resources to manage at once.

Once you have defeated or assimilated the whole continent into your tribe, the game moves into the fourth stage of play – a Civilisation clone. You start with a city, in which you can edit the four different building styles; Town Hall, House, Factory and a comedy-styled

or conquer another city, expanding aggressively until you ultimately control the whole world. Along the way, you'll get to build both naval and air units, though the latter will be much better for laying waste to your opponents. Here you also get special powers, which are unlocked depending on your playing style throughout the game, which are quite nifty. The CPU players also get these, which means that any warfaring species that have enough money to afford the "nuke all enemy cities" power will essentially hand you your species' collective arses on a smoking platter. This mode is quite decent, but again needs better use of resources – once you hit a certain point you have way too much money, and can't spend it all.

The final frontier
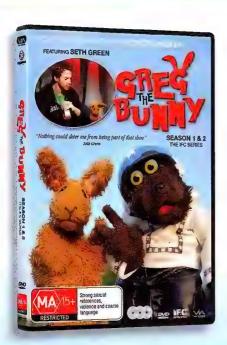
Moving further along in the evolution of your species, once you've completely taken over your home planet, you can build your first spaceship, and move out into the stars. Here is where you'll spend the majority of your playing time, setting up alliances or wars between other spacefaring species. You can also colonise other planets, as well as terraform them, and there's a multitude of missions to do. Unfortunately this last stage is rather odd, and rather than feeling in control of your species, you are simply one part of a much larger entity [that annoyingly can only afford the one ship, leaving you to defend your whole planet by

entertainment arena. These keep your citizens happy, as well as providing you with an increased population capacity, and an improved resource flow. Resources in this part of the game are spice geysers that you claim with vehicles. Both the vehicles and the buildings can be customised, allowing you the ability to create a 'themed' civilisation. When you have enough influence, you can either buy, convert

yourself against multiple enemies].

Spore could have been a genre-defining game, that could have broken barriers and ushered in a new benchmark of gameplay. But after the first playthrough, we found ourselves avoiding a second play, since it seemed almost boring. So for a single game, it's pretty decent. For what it could have been, it's really a joke. We'd recommend that you look elsewhere for your gaming bliss. **JR**

PC

Developer Maxis
Publisher Electronic Arts
Website www.spore.com

Graphics
Functional graphics, cute cartoony style. **87**

Gameplay
You'll play it a few times, but the RSI will eventually stop you. **59**

Sound
Realistic creature noises are offset by a generic soundtrack. **75**

Overall
Not a game for the hardcore, but casual players might find it a diamond in the rough

65%

Vexille

Director Fumihiko Sori
Starring Meisa Kuroki, Yasuko Matsuyuki, Shosuke Tanihara
Distributed by Madman Entertainment

Vexille – or as it's known in its native Japan, 'Vexille: 2077 Japanese Isolation' – is from the same production house that recently brought us the latest Appleseed film, and the much-lauded (and Atomic favourite) Ghost in the Shell: Stand Alone Complex. Production IG, it seems, knows what it likes when it comes CG anime epics, and that's powered armour, dystopian futures, and butt-kicking female heroes.

The film's story takes place in 2077, following a ten year period of Japanese isolation from the world stage. Since the UN outlawed the production of advanced robotics, the Daiwa corporation has pretty much cut Japan off from the outside world, though trade still takes place in a limited capacity. In an early montage, we discover just how much the rest of the modern world relies upon Daiwa machines.

Japan has kept this isolationist attitude enforced with a giant electromagnetic shield that keeps out prying eyes, and by deporting all foreigners. No one has seen Japan since the barrier went up, and when a number of leads point to flagrant abuse of the law prohibiting robotics and android research, a crack team of Special Forces types is sent in to investigate.

Telling any more of the tale would do the story a disservice, as there's a lot of twists and revelations to enjoy in this tale of technology given reign over human affairs.

The director, Fumihiko Sori, worked on the first (well, technically, the second) Appleseed film, and his comfort at dealing with questions of humanity and technology is apparent. So to

is Production IG's skill at designing futures and the machines that inhabit them, no doubt picked from their close association with Ghost in the Shell and Appleseed creator Masamune Shirow. Shirow has long been praised for his design skills, and if the future ends up looking like any of his forecasts, we're not going to complain.

The animation style is very similar to that

Japan has kept this isolationist attitude enforced with a giant electromagnetic shield that keeps out prying eyes...

featured in Appleseed: Ex Machina, a combination of realistic CG-style animation and cell-shaded-esque characters. It never doesn't look like a piece of anime, but all the machines and robots look stunningly real. This is anime that needs to be enjoyed on a big TV.

And a good sound system, too, as the original score is penned by trance DJ Paul Oakenfield. He's done a great job in creating a soundtrack which is an ideal match for the subject matter. You'll recognise a lot of the incidental music in the film, too, with artists ranging from The Prodigy to Dead Can Dance featuring prominently.

Overall the film is great piece of anime action, with quite a strong plot and some interesting characters. That said, some have drawn the conclusion that Production IG may well be trying to cash in on Appleseed's popularity, but we're not convinced that's a bad thing. Can you really have too many high octane, power-armoured action films?

We didn't think so. DH

FROM THE CREATORS OF APPLESEED

2077 Isolation of Japan

VEXILLE

M — Mature themes

Overall
Somewhat derivative, but still a great piece of animation.

79%

atomic

Caption Contest Winners Found!

We recently ran an online contest to find the funniest fans of Warhammer Online. Much funny was brought, and now ten lucky winners have received a copy of Warhammer Online: Age of Reckoning. We had some great entries that made as all lol, but the clear funniest was this effort from J. Bynon, VIC:

Keep an eye on **www.atomicmpc.com. au** for more great competitions and the chance to win fantastic prizes!

Google Chrome launches tabs in seperate processes.

Uggh?

Next issue!

NEXT MONTH

DIY graphics drivers – what can they do for you?

Crysis: Warhead, Far Cry 2 and STALKER: Clear Sky reviewed!

Massive Home Storage – the Atomic guide to building a home SAN.

The Lian Li Xbox 360 enclosure, reviewed and explained!

atomic